

School District Student Assignment and Reassignment Policies

by

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Public Policy Studies
Duke University

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Dissertation submitted in partial fulfillment of
the requirements for the degree of Doctor
of Philosophy in
Public Policy Studies in the Graduate School of
Duke University

2013

ABSTRACT

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Abstract

This dissertation examines the interplay between school district assignment and reassignment policies and the elementary public school parents select for their children. The sample in all chapters includes the third and fourth grade students in a subset of growing North Carolina school districts from 2003/04 to 2010/11. The data are derived from historical, longitudinal secondary data sources containing student, school, and district records. All chapters employ quantitative longitudinal data analysis methods. Chapter 1 identifies the groups of students who do not comply with their school assignments. Chapter 2 identifies the groups of students who are reassigned to different schools, and to schools of varying quality, when school districts enact reassignment plans. Chapter 3 identifies the groups of students who do not comply with school reassignments. Together, the chapters demonstrate the interplay between residential decisions, school choices, and the resulting educational opportunities of observably different students. Consistent with existing bodies of literature, the findings demonstrate unexplored processes through which advantaged families maintain the most desirable educational opportunities for their children. Policy implications of these findings are also discussed.

Dedication

With love and gratitude, this is for my family.

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I thank you all.

Introduction

United States public school districts are responsible for designing and implementing student assignment plans. Assignment policies define the environment in which the student studies, the educational resources available to her, and the teachers to whom she is exposed. Generally, students are assigned to specific schools according to zones of residence. As a consequence, parents who can afford to choose homes have greater capacity to select school assignments than families with less financial capital. As population dynamics shift within a district, schools open and close and some students must be reassigned. This dissertation focuses on these assignment and reassignment policies. The sample in all three chapters is the third and fourth grade students, their schools, and their parents in a subset of growing North Carolina school districts from 2003/04 to 2010/11.

Research on school assignment and reassignment policies was not previously possible. Access to both precise longitudinal student address data and to school district assignments over time is rare. To the best of my knowledge, they have never been linked. Scholars often lament the dearth of data on family residences and when they have it, many proxy school assignment by distance to school, for school assignments are not known (eg. Butler et al. 2013). The North Carolina Education Research Data Center at Duke University granted me access to their exact student address data. I then applied GIS techniques to a longitudinal panel of student assignment data to generate map layers reflecting attendance zones over time. Merging these unique data

elements together, I created a new dataset with precise linkage of students to school assignments and reassignments. Having such precise geographic records for both family location and school assignment on this scale is largely impossible given existing secondary data. The result of my data collection efforts not only enabled the work described herein, but could also be applied to other education policy research questions for which precise student geographic data is required.

Indicators representing students' assignments as urban, suburban, or rural are derived from the National Center for Education Statistics' urban-centric coding scheme that describes a school's location relative to an urbanized area¹. I collapsed the 12 urban-centric codes into three categories: urban, suburban (which includes all suburban and town classifications) and rural. Of note, the geographic indicators throughout this dissertation are based on the school location to which a student is assigned rather than her address. Given the relatively small size of most elementary school catchment areas, schools of a given geographic classification should draw students predominantly from that geographic type.

The school districts in this sample are all growing in population and have a mixture of school types: three of the districts contain both suburban and rural schools and three contain suburban, urban, urban,

¹ NCES codes are based on urban-centric criteria. Urban is defined as a territory inside an urbanized area with a population of at least 100,000; Suburban is defined as a territory outside a principal city and inside an urbanized area with a population at least 100,000 or a territory inside an urban cluster; Rural is defined as a census-defined rural territory of varying proximity to urban areas and urban clusters (http://nces.ed.gov/ccd/rural_locales.asp).

and rural schools. North Carolina is not unique in this regard: all 50 states have at least one school district with both suburban and rural schools, and 48 states (every state other than Hawaii and Vermont) have this mixture of suburban and rural schools along with student population growth from 2003/04-2010/11². In the 2010-11 school year, of the 47.2 million traditional public school K-12 students in the United States, nearly half (47.5 percent) attended schools in school districts with suburban and rural schools, and nearly a quarter (23.3 percent) attended schools in districts with urban, suburban, and rural schools. 14.6 million students (31 percent of the nation's traditional public school students) attended schools in growing districts with both rural and suburban schools. Given these commonalities between the districts in this sample and others across the nation, the findings from this dissertation have the potential to be relevant for many locations outside of the sample school districts and state.

Literature on the sociology of education teaches us that advantaged families are generally able to construct the most optimal educational opportunities for their children. These families produce advantages for their children both between- and within-schools. School quality is positively correlated with housing prices (Black 1999; Figlio and Lucas 2004; Ries and Somerville 2010; Dhar and Ross 2012), which means advantaged families pay more for homes with desirable school assignments. Advantaged families also lobby for better teachers and educational tracks (Hoover-Dempsey and Sander 1995; Lareau 2000;

² These totals were calculated by the author using public National Center for Education Statistics data on each public school in the country and its associated NCES location code, described above. The 2010-11 school year was the most current year of public access data at the time of writing.

Oakes 1992), and pursue gifted and other specialized school programs (Ball 2004; Bifulco, Ladd, Ross 2009; Lareau 2000). School district student assignment and reassignment policies set the distributional patterns of students among schools within each district. Advantaged families utilize this process to further construct and maintain improved educational opportunities for their children in three core ways: they can afford to live in homes with the most desirable school assignments (Chapter 1), they influence the policy process to avoid adverse reassignments (Chapter 2), and they often opt out of disruptive school reassignments (Chapter 3).

Chapter 1 identifies the groups of students who do not comply with their school assignments. Based on these observed decisions not to comply, one can make inferences about who is and who is not content with their school assignments. Certain subgroups of these discontent families, particularly urban families, have greater school choice options available to them and they frequently take them. Black students, regardless of having an urban, suburban, or rural school assignment are the least likely racial subgroup to comply with their assignments. Suburban families are the most likely student subgroup to adhere to their school assignments. If school choice options that break the link between residential location and school assignments were expanded, urban and black students would be the most likely groups to partake. Many suburban families have already met their school preference through the housing market. Therefore, they should not be as influenced by changes in school choice policies.

Chapter 2 identifies the groups of students who are reassigned to different schools, and to schools of varying quality, when school

districts enact reassignment plans. By inference, those families who are reassigned to worse schools are less empowered in the political process. The evidence shows that rural and urban families are more likely to be reassigned than are suburban families. Suburban families avoid reassignments, particularly reassignments to schools of lower quality. Suburban families, who generated school assignment advantages through residential choices, also mobilize their political capital to construct and maintain the best educational opportunities for their children. These findings again echo existing social stratification literature on how advantaged families "hoard" opportunities for themselves (Tilly 1998).

Chapter 3 identifies the groups of students who do not comply with school reassignments. Behavioral economics research on defaults teaches us that individuals generally prefer the simplest, default option (Johnson and Goldstein 2003; Thaler and Bernatzi 2004; Gale, Iwry, Orszag 2005; Johnson and Goldstein 2003; Madrian and Shea 2001; Tversky and Shafer 1992), unless there is a reason to opt out of the default (Dinner, Johnson, Goldstein, and Liu 2011; Thaler and Sunstein 2003). Applied to student reassignments, the policies dictate that some students need to change schools in non-promotional years. This unexpected school move is a sufficient enough disruption to prompt parents to opt out of the plans. Indeed, over half of reassigned families do not comply with their reassignments. The most common behavior is for students to continue to attend their original schools, in spite of being reassigned to a new location. Urban students are the most likely subgroup not to comply with reassignments. Despite being

highly unlikely to be reassigned, suburban non-poor families also opt out of their reassignments when they do occur.

Chapter 1- What Types of Students are most likely to Opt Out of their Traditional Public School Assignments?

1.1 Introduction

This chapter identifies the observable characteristics of students who opt out of their traditional public school assignments. The overall goals are to introduce the dataset that will be used in the three dissertation chapters, to identify the overall rate of school assignment noncompliance across student subgroups, and to use the revealed parent decision to make inferences about how content families are with their neighborhood schools. The results indicate that many families indeed select a non-assigned school, and these choices are most common in urban area. These findings, along with the more nuanced subgroup patterns by race, socioeconomic status, and geography, provide insights about parents' contentment with their assigned schools relative to their alternatives.

Individual elementary schools within a given school district frequently vary in quality, and parents typically try to find the best schools for their children. Geographic locations generally determine school assignments at the time parents choose to buy or rent housing; however, not all students attend their assigned schools. The interaction of residential and school choice decisions of families with student assignment and school choice policies determine what school a student attends. We might expect choices to attend a non-assigned school to be positively correlated with income; however, more advantaged families are able to purchase or rent homes with desirable

school assignments. Since the decision to opt out of a school assignment temporally occurs after residential selection, those choices might be most common among families with less financial flexibility to select a home with a desirable school assignment.

School assignments matter for student opportunities because the quality of schools differs across schools within a single district in terms of teacher quality (Clotfelter, Ladd, Vigdor, and Wheeler 2006; Clotfelter, Ladd, and Vigdor 2011; Lankford, Loeb, and Wyckoff 2002), students' academic performance (Clotfelter, Ladd, and Vigdor 2005; Goldsmith 2009; Hanushek and Rivkin 2009; Roza et al. 2004), curriculum options and teacher expectations (Oakes 1990), and financial resources (Condrón and Roscigno 2003; Rubenstein et al. 2007). Students at schools with wealthier students tend to perform better than students at poorer schools (Anyon 1980).

Families consider certain school assignments to be more desirable than others. Families might prefer a non-assigned school based on the characteristics of the students or the teachers, including the racial or socioeconomic composition of the students, and the quality of the teachers and principal. Many school districts allow some degree of choice among the public school options. Choice options break the link between place of residence and the school assignment. These choice policies are often designed with disadvantaged students in mind. Their goal often is to allow students assigned to low performing schools an opportunity to attend a better school.

Schools of choice can be explicit, such that all or at least a large segment of the students are not assigned to those schools based on residence. Magnet, charter, and year-round schools are common

examples. Another option is when parents opt out of their assigned schools and students attend a non-assigned, non-explicit school of choice. For example, parents might petition the district to allow their child to attend a different traditional public school in the district. These requests are most commonly granted when the child has a sibling at a different school, when she previously attended the other school and wants to remain there, or if there is a specialized academic program (eg. for exceptional or gifted students) for the child at the school.

Opting out of school assignments is a choice only some families make. On the one hand, advantaged families likely have greater social and political connections to enroll their students in their most desired option. On the other hand, advantaged families are better equipped, particularly financially, to live in a residence that is assigned to more desirable schools, thereby reducing the need to opt out of assignments. Disadvantaged families are financially limited in their capacity to select residences in the best school catchment areas; however, if policies are designed to improve poor students' educational opportunities, these disadvantaged families might be more likely to opt for a school of choice.

This discussion generates one primary line of questioning: to identify the observable differences in the types of students who do not comply with their school assignments. Evidence in this line of inquiry will make it possible to make inferences about how content parents are with their child's school assignment. If parents were all pleased with their assignments, we would observe high rates of adherence to the school district policies. High rates of non-adherence to school

assignments indicate, at the very least, a preference for alternate schools over families' assigned schools. This study is empirical and is based on a convenience subsample of growing North Carolina public school districts and their respective third and fourth grade students between 2003/04 and 2010/11.

1.2 Conceptual Framework

This study examines children in a sample of school districts in North Carolina. Data are used on the characteristics of students to predict how the demographic characteristics of children are associated with the odds of opting out of one's school assignment. The school a student attends is a two-step process by families. First, families select a residence that has an associated school assignment. Next, the family can choose to send their child to a non-assigned school. This research addresses the overall noncompliance with school assignments and also investigates the differences in opt out decisions by the geography of assignments (to urban, suburban, or rural schools) and by students' socioeconomic status.

Motivating the subgroup analysis by socioeconomic status is the fact that while choice policies are often designed with disadvantaged students in mind, accessing and acting on the information required to benefit from these school choice plans can be more challenging for disadvantaged families. Motivating the subgroup analysis by geographic type are the differences in school quality and composition across locations. Suburban homes are typically more expensive than rural or urban alternatives, so these families tend to have the greatest

financial resources in a district. Urban residents are more likely to be nonwhite than in the suburbs or rural areas, and urban schools generally have the highest concentration of poor students. Rural patterns are mixed. Often, these families are more likely to be white, but they also tend to be less advantaged than whites who live in the suburbs. The range of affordability of various residential locations can lead to varying desires for parents to opt out of their affiliated school assignments. In these dissertation chapters, the geographic designations refer to the urban, suburban, or rural status designated to each school location according to United States census demarcations. Given that most elementary school zones are small, and I have precise school assignments, the geographic indicators for the students are a reasonable proxy for the geography of their neighborhood.

The findings from the analyses can be used to make inferences about how content families are with their default school assignment, according to whether or not students actually attend their assigned schools. Figure 1 illustrates the interplay between district policies and parents' decisions in producing students' school of record. Although past school district decisions regarding school locations, school assignment plans, and school choice options, and parents' residential decisions are each important processes in their own right, these processes (all white boxes in the figure below) will be treated as givens in the analyses. By identifying whether a student attends her assigned school, it becomes possible to make inferences about her parents' satisfaction with her school assignment. Families who do not follow school assignments can be assumed either to be displeased with

their assigned school or at least to be pleased more with an alternate school over their assignment.

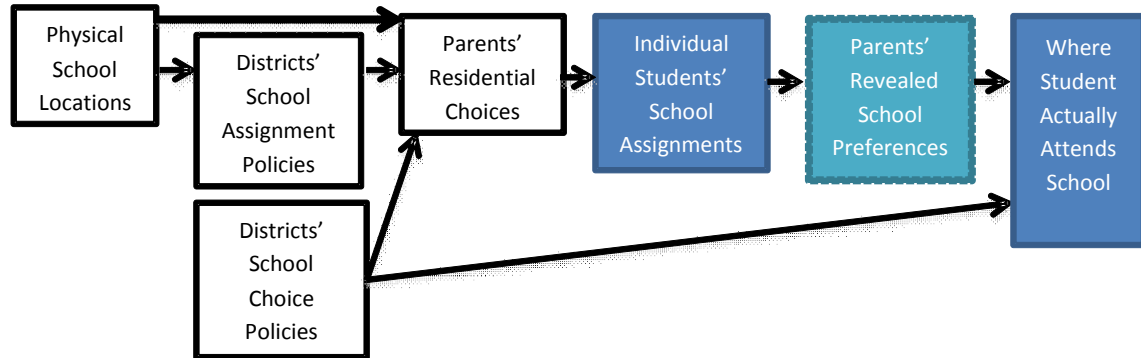


Figure 1: Interaction between Parents' Choices and School District Policies

Those who do comply with assignments likely fall into one of three categories. First, and most obviously, they might be pleased with their assignments. Families may have even selected their residence specifically so as to be assigned to that school. Second, families could be content, though not ecstatic, with their assignments. These families might have determined that their school is acceptable, or even good, and not worth opting for a different school of choice. Third, they might not like the assigned school, yet they may not have sufficient information or resources to opt out of their assignment. Regardless of which phenomenon drives parents' decisions to opt for a different school, families that do not comply with their assignments prefer some other school to their assigned school. In addition, some of the compliers might also be discontent. Therefore, noncompliance with school assignments provides a conservative, lower bound estimate of parents' dissatisfaction with their assigned neighborhood school.

This chapter highlights the interaction between parents' decisions and school district policies as having direct and substantive

impacts on students. This research contributes to broader literature of two types. First, social science literature highlights how middle class families work the education system to their advantage. This chapter provides the opportunity to identify a possible additional mechanism through which advantaged parents create and maintain better educational opportunities for their children. Second, the research demonstrates an additional mechanism through which school districts influence schools, students, and families. For example, school districts are responsible for the upkeep and maintenance of school properties, including acquiring new land and building new schools when needed. They also set hiring rules regarding teacher distribution and pay among schools. Districts additionally regulate both teacher and student transfer policies and select the curriculum and materials to be used at schools. Finally, and most relevant for this analysis, districts set assignment policies, which determine the schools students attend.

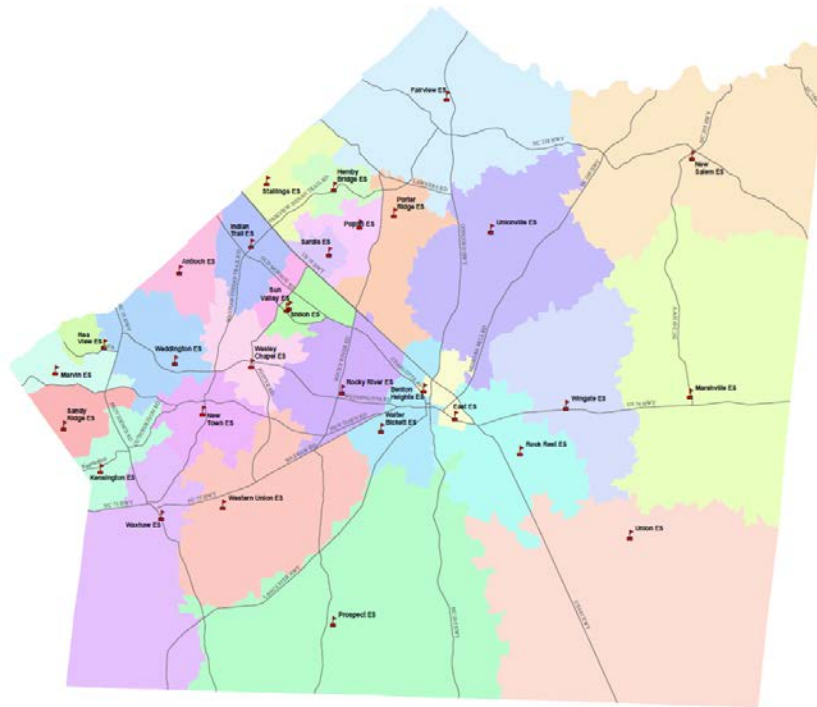
1.3 The Role of School District Policies in Student Assignments

Regional planners often assist school districts to design attendance boundaries; however, the resulting plans typically contain catchment areas of different shapes and sizes, and with sometimes centered but more often off-centered schools in the regions. Figure 2 illustrates school assignments in the 2010-11 academic year for Union County, North Carolina. In the figure, school catchment areas are delineated by different colors, and the school locations are designated by small, red flags. The figure demonstrates the different sizes and

shapes of catchment areas. The fully exhaustive, mutually exclusive regions comprise the school districts' geographic landscape. A student residing within any of these geographic regions will be assigned to the school in that zone.

In the case of Union County, some assignments follow major roads while others do not. Average commute distances and average commuting times vary. There is little consistency between school zones as to what distance of a residence to the physical school location will ensure assignment to that school. In this chapter, I only include districts that use this most common form of school assignments, namely where the typical school region in the district is contiguous³.

³ During the course of this panel, Wake County (Raleigh, NC) utilized a system of assignments where most schools contained multiple non-contiguous regions for the same school. The intent of that plan was to generate more equitable school populations based on students' socioeconomic status. I do not study Wake County, or other school districts that employ non-traditional balancing assignments, because that type of assignment is very rare in the United States.



(http://fpc.ucps.k12.nc.us/documents/ES_Locations.pdf)
Figure 2: Union County Elementary School Assignments 2010-2011

Despite these assignment maps, not all students attend their assigned schools. Several school choice options exist, including magnet schools and year-round schools. The extent to which the options are available is at the discretion of school districts and sometimes dictated by state policy. For example, North Carolina had a policy mandating a statewide cap of 100 charter schools during the course of this study. The popularity of the different choices among families also varies.

School districts might permit school choice among the schools within their borders for specialized academic programs and/or integration efforts. For example, magnet schools focus on a particular content area and draw from students across the district. These schools were originally designed to help voluntarily integrate students in

racially segregated school districts (Archbald 2004). Magnet schools are typically open by application to all students in the district and are populated in part by neighborhood students and in part by students who have applied to attend the school.

Year-round schools have been growing in popularity to combat summer learning loss (Entwisle and Alexander 1992; Ready 2010). However, not all parents are interested in the year-round school schedules. Therefore, some districts populate year-round schools in a manner similar to magnet schools: with parents applying for admission as long as they reside somewhere within the school district.

Most school districts also permit families to apply for waivers from their assigned schools. For example, a family that moves residences between a child's fourth and fifth grade years might request that their child remain in the same school for its terminal elementary school year. In addition, the federal No Child Left Behind law provides families with the opportunity to attend a different school if their assigned school repeatedly does not meet student achievement benchmarks. Finally, specialized programs, such as dedicated programs for exceptional children, academically gifted children, or rigorous language education, sometimes consolidate those groups of students at a specific school. Students attending these specialized programs, therefore, might not attend their assigned schools. Each of these programs provides some opportunity for students to attend a non-assigned school.

Motivating this dissertation chapter is the fact that families are not equally likely to adopt each of these choice options. The following section provides a discussion about the ways in which

parents' residential choices, opinions of school quality, and likelihood to send their children to a non-assigned public school differ among groups of students.

1.4 The Role of Parents in Student Assignments

Three primary bodies of literature address relevant parental behavior towards student assignments. One body describes how parents make residential decisions, specifically as the choices relate to public schools. The second addresses how parents use their social networks to obtain and assess information about school quality. The third body explores school choice options. In all three bodies, the literature clearly shows that parents who are more advantaged have the greatest capacity to satisfy their preferences than disadvantaged parents. Taken together, parents with more income and more education can make strategic housing, schooling, and school choice decisions to generate improved educational opportunities for their children (eg. Parcel, Dufur, and Zito 2010; Tilly 1998).

1.4.1 Parents make residential decisions based on schools

In the United States, families with school-aged children who intend to use the public school system often choose homes "for the schools" (Holme 2002). However, the ways parents assess what constitutes a "good" school varies, especially by socioeconomic status. When asked which factors they consider most important for choosing schools, most parents list academic and teacher quality (Hastings, Van Weelden, and Weinstein 2007; Schneider et al. 1997). Considerable

evidence documents the price premium for homes assigned to schools with higher test scores. Davidoff and Leigh (2008) reviewed evidence on housing hedonics studies from six domestic and six international quasi-experimental studies that document the price premium for homes linked to better schools, as defined by test scores. They found that a 5-percentage point increase in test scores (approximately 1 standard deviation) is associated with a 3.5 percent increase in house prices.

While parents may claim to prioritize objective academic superiority, the evidence suggests that many actually care more about the racial and socioeconomic composition of the student body (Clapp et al. 2008; Card and Rothstein 2007; Holme 2002; Koedel, Betts, et al. 2009; Fossey 1994). White families often attempt to avoid schools with high proportions of black students, while black families tend to favor schools with lower proportions of students in poverty (Saporito and Lareau 1999). A study of parents' perceptions of school quality in Connecticut suggests that the role of race has become more pronounced over time whereas the role of academic performance has declined (Dougherty et al. 2009).

Advantaged families have more market power to purchase homes relative to disadvantaged families. Many house price hedonic regression studies have demonstrated a positive association between school quality and housing prices (Black 1999; Figlio and Lucas 2004; Ries and Sommerville 2010; Dhar and Ross 2012). Even controlling for differences in location by income, children from poor families in the United Kingdom are significantly less likely to go to good schools, regardless of the extent to which school choice options exist (Burgess and Briggs 2010). Since residences are tied to school assignments, and

assignments generate different educational opportunities for students, parents who can afford to do so “vote with their feet” (Tiebout 1956) to enroll their students in schools they perceive to be more desirable.

The residential decisions parents make have implications for the distribution of families across both neighborhoods and schools. These choices lead to housing segregation (eg. Pais, South, and Crowder 2009), and thus school segregation (eg. Bifulco, Ladd, Ross 2009; Lankford and Wyckoff 2006). Even small differences in the preferences families have about the racial composition of their neighborhoods lead to large segregative effects (Schelling 1971). Observable differences in schools influence perceptions of the quality of those schools, which in turn affect parents’ housing preferences.

Simultaneously, the residential compositions of neighborhoods are related to school segregation, as school assignments are based on residence. This process is cyclical and creates a positive feedback loop between school and housing segregation (Tauber and James 1982). School segregation by race in the United States is increasing. School desegregation plans instituted following the landmark *Brown v. Board of Education* (1954) Supreme Court decision are far less likely to still have court-ordered oversight. As a result, American public schools across the nation, and especially in the South, have been subject to resegregation by race (Reardon et al. 2012).

Perceptions of schools are not always consistent across parents of different subgroups. Further, the racial preferences misalignment makes it impossible to sort races to satisfy the preferences of all groups (eg. Vigdor 2003). The segregating choices made by wealthier families are most likely to trump the integrating choices made by

disadvantaged families (Bifulco, Ladd, and Ross 2009). This chapter takes residential choices and school segregation as given at a point in time and emphasizes the school choices families make in light of these residential preferences and school quality patterns.

1.4.2 Parents obtain information about schools through their social networks

The homophily principle holds that people have personal networks that are largely homogenous (McPherson, Smith-Lovin, and Cook 2001). This homogeneity limits information gathering to the views of people most similar to oneself. For example, attorneys are more likely to know other attorneys than welders and welders are more likely to know other welders than attorneys. While the personal networks of individuals from different social classes are likely to vary in composition, advantaged families are additionally more likely than disadvantaged families to know or at least have access to a wider variety of people (Granovetter 1973). For example, welders are likely to know and interact with electricians and contractors, but not professors; lawyers are likely to have direct contact with a much more diverse set of clients, including other highly educated professions, service employees, and welders alike. Consequently, the total information available to an individual naturally differs by his or her class (Bosetti 2004). This broad reach of social networks is often referred to as "extensity" in the social capital literature, and is contingent upon initial positions in the social hierarchy (Lin 1999, 2001). Further, individuals privilege information learned through their social networks over the information provided by schools (Ball

1998). Based on these theories, advantaged families are likely to have more information about school quality and school choices than disadvantaged families.

These social networks can provide greater opportunities for advantaged families to learn about the quality of different schools. In her summary of the literature on parents' social capital in school choices, Bell (2009) details both the use of social networks to obtain school information, and the unevenness in these networks for families of different socioeconomic status. For example, the hypothetical lawyer described above is more likely than the welder to know individuals who can help access and interpret test score data online, have connections to a teacher or principal who can provide perspective on the quality of local schools, and have a realtor who can direct them towards or away from certain neighborhoods according to the school quality.

Transactions costs (Coase 1960) to learn about and understand school quality differences are substantial. Social networks play a substantively meaningful role in the residential choices of families. Homophily and social capital differences drive the different information gathering procedures for advantaged and disadvantaged families. In turn, these differences produce varying abilities for families to access and understand information about general school quality and about school choice options (Hastings and Weinstein 2008; Schneider et al. 1997; Epple and Romano 1998). The limited social networks among disadvantaged families imply that the most disadvantaged families likely neither have the same access to information, nor the resources to opt out of their assigned schools. Therefore, school

assignment noncompliance can be considered a lower-bound estimate for their displeasure with school assignments.

1.4.3 Some Parents make school choice decisions

Those parents with the financial and social capital to do so make school choices for their children at several decision points. First, parents choose where to live. Second, some families seek school choice options. This process takes considerable knowledge to know the options, evaluate their potential, and apply to the specific school program. Third, families often need additional resources to enroll in choice programs. For example, many charter schools do not bus children to schools, so parents of charter school students are responsible for providing school transportation. Also, year-round school breaks may not align with subsidized child care or enrichment programs. Working parents of year-round students must be able to find and afford the child care options that occur during the additional school breaks.

School choice decisions vary by student achievement (Bifulco, Ladd, Ross 2009), socioeconomic status (Brunner & Imazeki 2008), and race (Lankford and Wyckoff 2006; Renzulli and Evans 2005). What whites choose versus what blacks choose differs (eg. Saporito and Lareau 1999). White families are more likely to choose private schools (Fairlie and Resch 2002; Figlio & Stone 2001; Lankford, Lee, Wyckoff 1995; Reardon & Yun 2002; Saporito 2003) and other school choice programs (Hastings, Kane, Staiger 2005; Saporito 2003). Affluent white families tend to transfer schools without moving homes (Renzulli and Evans 2005). Researchers found that black families in North Carolina are more likely to favor charter school in urban areas and those that

target at-risk students (Bifulco and Ladd 2007). The result of all of these choices is that “poor and minority children are much more concentrated in high-poverty public schools than they would be if all children attended their local schools” (Saporito and Sohoni 2007).

1.5 Data

This chapter focuses on North Carolina, a large state with substantial variation across its 100 counties and 115 school districts in terms of size, population density, student composition, and population growth. It is therefore a useful location for case studies on educational topics that can have different impacts in urban, rural, and suburban locales.

The data for this paper derive from diverse sources at the school district, school, and student levels. I integrated detailed student-level administrative records with information on students’ geographic school assignments for a subset of North Carolina school districts, schools, and students from 2003/4 to 2009/10. Together, these data form a unique and extremely rich and granular database at both the district- and student-level.

1.5.1 Student Data

The North Carolina Education Research Data Center (NCERDC) at the Child and Family Policy Center at Duke University maintains longitudinal, multilevel, administrative records on all North Carolina public school students, schools, and school districts. Individual student records contain information such as race, ethnicity, gender, participation in the federal free and reduced price lunch (FRL) subsidy

program, Limited English Proficiency (LEP) status, and standardized End-of-Grade (EOG) test scores in math and reading. These covariates are included in all models in this and future chapters.

Most elementary schools are configured from kindergarten through fifth or sixth grade, making the transition from third to fourth grade one that generally occurs within the same school. Because students and parents in third and fourth grades anticipated remaining in the same school between years, these grades represent a stable time in students' schooling where no school choice decision needs to be made. Third and fourth grade students are the research subjects in the chapter because of the expected stability of students' educational environments afforded by elementary school grade configurations.

The residential data used in this chapter are extremely granular. In North Carolina, the Institute for Transportation Research in Education (ITRE) at North Carolina State University serves as clearinghouse for all school districts to use when designing bus routes. Since school buses must take students from their home to their assigned schools, ITRE has information on where each public school student in the state resides at the beginning of each school year. ITRE provides these exact student addresses to the NCERDC. As a consequence, data in this chapter on student residential location are exact home addresses. At the NCERDC, the student data are coded with the same unique student identifier as in the other administrative records by linking students' names, social security numbers, and birthdates. I used ArcGIS software to geocode the de-identified individual student addresses. Thereafter, I linked the individual

students to their school assignments, which I derived from districts' school assignment maps.

1.5.2 School Data

School data are derived from the National Center for Education Statistics' Common Core of Data. These data contain basic demographic information about schools, such as their location, sizes, racial compositions, percentage of students performing on standardized tests at or above grade level, and the percent of poor students in each school.

1.5.3 School District Data

School districts in North Carolina are generally coterminous with counties, which makes them large. I collected and compiled a set of longitudinal school attendance boundary maps for elementary schools from select districts and years described in the following subsection. These maps are in the form of shapefiles. This data format is advantageous over paper maps because shapefiles have incorporated the projection from 2-dimension maps to the spherical geometry of the earth. Address data can therefore be reliably linked to maps in this format using geographic statistical software, unlike paper maps. Five of these district maps come from ITRE and its affiliate, the Operations Research and Education Laboratory (OR/Ed). To increase the number of cases in the sample, I searched for additional school districts in the state that had high NCERDC-ITRE match rates and that had maps in shapefile format available from an alternative source. The Durham County School District has retained historical shapefiles of student assignments and the district also had a high administrative student

data and address data match rate. Therefore, I supplemented the sample with this school district to make six districts in total.

1.6 Sample Selection

Specific districts at specific points in time were chosen for their utility in addressing the research questions posed by this chapter. Most obviously, districts were selected for altering student assignment plans at some point during the time evaluated (for analyses in future chapter). Further, data were selected for quality. First, because of imperfect matching of ITRE and NCERDC records, only a subset of student assignment maps were geocoded with sufficient data to be reliable; these tended to occur in the later years of the NCERDC panel. Similarly, ITRE and OR/ED were selected when data in consecutive years were available.

1.6.1 School Districts in Sample

Since North Carolina's population is growing, the most common reassignment plans in the state occur when a district opens a new school to accommodate a population increase. I therefore chose to focus on counties that have grown in recent years. Together, the convenience sample of the districts and years is depicted in Figure 3 and detailed in Table 1.

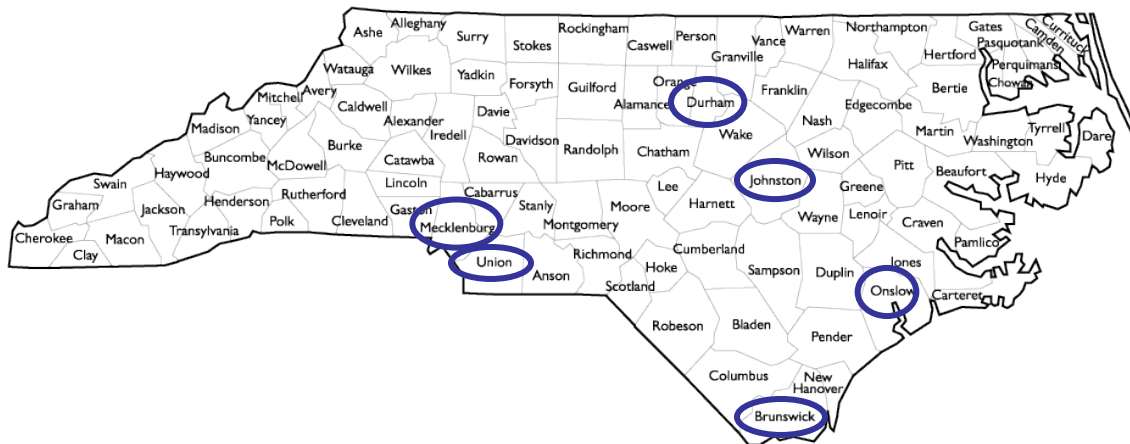


Figure 3: County Map of North Carolina

Table 1: School districts and years in the sample

Schl Years	Brunswick	Durham	Harnett	Charlotte-Mecklenburg	Onslow	Union
2003/4 & 2004/5	X				X	X
2004/5 & 2005/6		X			X	
2005/6 & 2006/7		X			X	
2006/7 & 2007/8		X	X	X	X	
2007/8 & 2008/9		X	X	X		
2008/9 & 2009/10		X		X		
2009/10 & 2010/11				X		

*Note: These are districts and years for which I have geographic boundaries in consecutive years and in which at least 60 percent of the students have address data.

The 6 counties in the sample are diverse in location, size, growth, and demographic composition. These districts all grew at faster rates than the national average, yet they still varied in rate of growth, minority composition, and levels of education, income, and poverty. Table 2 provides detailed information on the county demographics and population growth for each school district in the sample. Brunswick County is on the southeastern coast of North Carolina. It is part of the Wilmington Metropolitan Statistical Area,

and is the 37th fastest-growing county in the United States⁴. Durham County is home to Durham, and to Duke University. Harnett County is adjacent to Wake County, in which the state capital, Raleigh, is located. Mecklenburg County contains Charlotte and is both the most populated and the densest county in the state. It is the center of the Charlotte Metropolitan Statistical Area. Union County borders Mecklenburg County. Onslow County is on the coast and contains the Jacksonville Metropolitan Statistical Area.

⁴ <http://www.brunswickedc.com/>

Table 2: Descriptive Information about Counties in Sample

School District in Sample	2010 population	2000-10 % pop growth	2010 % White	2010 % Black	2010 % Latino	2006-10 % >25yrs with college degree	2006-10 Median HH Income	2006-10 % below poverty
Brunswick	107,431	46.9	83.0	11.4	5.2	23.4	\$45,806	13.5
Durham	267,587	19.8	46.4	38	13.5	44.1	\$49,894	16.1
Harnett	114,678	26	68.3	20.9	10.8	16.0	\$42,853	16.5
Mecklenburg	919,628	32.2	55.3	30.8	12.2	40.0	\$55,294	12.5
Onslow	177,772	18.2	74.0	15.6	10.1	17.7	\$43,561	13.8
Union	210,292	62.8	79	11.7	10.4	29.1	\$63,368	8.5
North Carolina	9,656,401	18.5	68.5	21.5	8.4	26.1	\$45,570	15.5
USA	311,591,917	9.7	72.4	12.6	16.3	27.9	\$51,914	13.8

Source: United States Census Bureau

Private school enrollments vary within these districts, as seen in Table 3. In the fall of 2007, about 7.2 percent of elementary school students in the United States attended private schools⁵. The two largest districts in this sample, Mecklenburg county and Durham County have private school enrolments comparable to the national average. The other four districts have private school enrolments far below the national average. Since the vast majority of school-age children in these districts attend public schools, school district policies are particularly relevant for the children in these districts. Of note, in addition to private school options, each district in the sample provides some opportunity for school choice within the public school system.

Table 3: Students in private schools, select years

County	Year (spring)	# students in grades 3 or 4 in private schools	# students in grades 3 or 4 in NC admin data	% private
Brunswick	2004	57	2,795	2.0
Durham	2009	742	8,689	7.9
Harnett	2009	66	4,673	1.4
Mecklenburg	2010	3,003	35,187	7.9
Onslow	2007	165	5,648	2.8
Union	2005	192	8,791	2.1

Source of private school data: North Carolina Division of Non-Public Instruction

1.6.2 Schools

Schools in the sample have different grade configurations, as detailed in Table 4. By far, the most common configuration is elementary schools that start in kindergarten or pre-kindergarten and

⁵ http://nces.ed.gov/programs/digest/d10/tables/dt10_038.asp

go through the fifth grade. A few schools in the sample combine elementary and middle grades or combine elementary, middle, and high school grades. This chapter addresses students in non-promotional grades. Therefore, students in the fourth grade of the KG-4 school were omitted from analyses. All other schools in the sample extend beyond fourth grade. Students in grades 3 and 4 in each school are included in the sample.

Table 4: Grade Configuration of Sample Schools

	# Schools in Sample
PK or KG through 5th Grade	162
3rd Grade ⁶ through 5th Grade	4
4th Grade through 5th Grade	2
KG through 8th Grade	1
KG through 4th Grade	1*

*The 4th grade cohort in this school was dropped from the sample

Nearly all of the schools in this sample are traditional public schools. A small number of the schools in these school districts are schools of choice. Table 5 reports the number of students in the sample districts that attend charter, magnet, and year-round schools. Charter schools in North Carolina are independent of the traditional school districts and all students attending charter schools have chosen that school over a traditional public school⁷. Magnet and year-round

⁶ Although these third graders (and the fourth graders in the two 4-5 schools) are in a promotional grade, the following year, they will not need to change schools due to a promotion. Given the purpose and future sampling needs of Chapters 2 and 3 of the dissertation, these third graders are included in the sample. Sensitivity analyses that omit these students do not alter the results.

⁷ It is possible that these charter school students do not reside in the traditional public school district identified. In North Carolina, charter schools are independent school districts. The charter schools identified in this sample, while distinct from the Local Education Agencies in the sample,

schools have a combination of students assigned to those schools along with a group of students who have chosen those schools over their assigned neighborhood school option. Durham and Mecklenburg Counties have the greatest number of students in choice schools. Harnett County has no explicit choice school options.

Table 5: Charter, Magnet, and Year Round School Enrollments by District (all years), in sample

District (2004-2010 aggregated)	Charter Students	Magnet Students	Year Round Students
Brunswick	86	-	412
Durham	2,300	349	3,004
Harnett	-	-	-
Mecklenburg	2,762	6,698	45
Onslow	-	-	43
Union	239	-	871

1.6.3 Students

As noted earlier, not all student addresses can be linked to the NCERDC administrative educational records. In these cases, the cause for the absence of addresses in the administrative data cannot be ascertained, although several causes are possible. First, and most probable, there might have been insufficient individual-level data from ITRE on which to match students to the administrative data. Second, the ITRE data is gathered in the fall of the academic year whereas other demographic and academic data are gathered from spring End-of-

are assigned to the traditional public school district if the school location falls within the geographic boundaries of that district. Since these charter schools are located within the borders of the sample school districts, these analyses assume that the students attending those charter schools reside in the school district and would otherwise have attended a traditional public school in that district in the absence of the charter school.

Grade exams. Third, it is possible that students who do not use buses to get to school are missing from the ITRE data.

Among the students who do have geographic data, over 98 percent of the addresses in the NCERDC data can be geocoded and linked to the geographic attendance data. The most common reason for unmatched addresses is that some zip codes contain multiple streets with the same name. In these cases, the geocoding process cannot distinguish between identically named streets. Table 6 provides match rates for districts in some of the later years each district is in the panel. About 79 to 95 percent of students in these districts have address data. Since some student addresses are missing, I test (see Appendix A) whether these missing cases would bias the results and weight all models to account for these differences.

Table 6: Details about geocoded data, in sample

County	School Years (spring)	# students in grades 3 or 4 in NC admin data	# students in grades 3 or 4 with matched address data	% match
Brunswick	2004	1,774	1,530	86.2
Durham	2005-2009	22,793	20,980	92.0
Harnett	2007-2008	3,925	3,190	81.3
Mecklenburg	2010	53,643	49,813	92.9
Onslow	2007	13,141	12,021	91.5
Union	2007	5,478	4,851	88.6

Indicators representing students' assignments as urban, suburban, or rural are derived from the National Center for Education Statistic's urban-centric coding scheme that describes a school's location relative to an urbanized area. I collapsed the 12 urban-centric codes into three categories: urban, suburban (which includes all suburban and town classifications) and rural. Of note, the geographic indicators are

based on the school location to which a student is assigned rather than her address. Given the relatively small size of most elementary school catchment areas, schools of a given geographic classification should draw students predominantly from that geographic type. All sample districts have both suburban and rural schools. Half of the sample districts include urban, suburban, and rural schools and the other half include only rural and suburban schools.

Table 7: Percentage of Students in Assigned to Schools of Different Geographic Classifications

School District	Number of Students	Urban School Assignments (%)	Suburban Assignments (%)	Rural Assignments (%)
Brunswick	1,774	0.0	28.2	71.8
Durham	22,793	74.9	6.2	18.9
Harnett	3,918	0.0	28.9	71.1
Mecklenburg	53,643	62.8	22.8	14.4
Onslow	13,141	27.6	39.0	33.4
Union	5,478	0.0	27.2	72.8

Table 8 provides summary demographic statistics for all the students in the sample. White students comprise about 40 percent of the sample, and black students comprise 36 percent. Nearly half (47 percent) of the students are of low-socioeconomic student status, defined in this and future chapters as being eligible for free (family income is below 130 percent of the poverty line) or reduced price (family income is less than 185 percent of the poverty line) lunch.

Table 8: Whole Sample Characteristics

	Observations	Mean	Std. Dev.
Student Variables			
White	100,747	0.41	0.49
Black	100,747	0.38	0.48
Latino	100,747	0.13	0.33
Asian	100,747	0.03	0.17
Multi, Other, or Missing Race	100,747	0.06	0.24
Free or Reduced Price Lunch Eligible	100,747	0.46	0.50
Standardized Math End of Grade Score	100,747	-0.02	1.02
Missing Math EOG Score Indicator	100,747	0.03	0.17
Limited English Proficient (LEP)	100,747	0.10	0.29
Missing LEP Indicator	100,747	0.00	0.05
Female	100,747	0.50	0.50
Old for Grade	100,747	0.16	0.36
Missing Birthday	100,747	0.03	0.16
Third Grade	100,747	0.49	0.50
Fourth Grade	100,747	0.51	0.50
Type of School Assignment			
Assigned to Urban School	100,747	0.54	0.50
Assigned to Suburban or Town School	100,747	0.22	0.41
Assigned to Rural School	100,747	0.24	0.43
District Variable			
Lagged 5-year District Student Population Growth	100,747	3.23	1.84

Over 85 percent of the students in the sample have address data that could be matched to school assignments. Not correcting for the differences between the students who do and do not have geocoded data could introduce a source of bias. To identify these potential differences, I ran a logistic regression to predict whether a student in the administrative data also has geographic data present. The dependent variable in this model is a binary indicator for whether a

student has an address in the data and is a function of a vector of individual student characteristics, the lagged 5-year total student population growth in the district, and fixed effects for the district, grade, and year of the observation in the following form:

$$\text{Log}\left[\frac{\text{Student has Address Data}}{1-(\text{Student has Address Data})}\right] = \beta_0 + \beta_1 * \text{StudentCharacteristics} + \beta_2 * \text{DistrictGrowth} + \gamma_{\text{District}} + \lambda_{\text{Grade}} + \alpha_{\text{Year}} + \text{error}.$$

Individual-level covariates include student race (White is the reference group and other race options are Black, Latino, Asian, Multi/Other), FRL (the reference group is not poor), the geography of the school to which a student was assigned (City is the reference groups, and the other geography options are suburb and rural), the main effects, interactions, and triple interactions of race, FRL, and geography, a students' standardized math test score, indicators for having limited English proficiency (LEP), female, and old for grade (defined as having a birthdate after the cutoff for students in that grade and year). Appendix A contains the logistic regression results. As results are odds ratios, a value less than one indicates a lower probability than the reference group of having address data and an odds ratio greater than one a higher likelihood of having address data.

Students who are FRL Eligible, black, assigned to suburban and rural schools, LEP, and higher standardized math test scores are more likely to be geocoded than non-poor, white, urban, non-LEP, and lower math performance students. Students less likely to be geocoded include all other minority groups, old-for-grade, and many of the nonwhite suburban/town, nonwhite rural, poor suburban/town, and poor rural

student interaction subgroups. While several odds ratios from this model were statistically significant, results are not consistent across either advantaged or disadvantaged student groups. Therefore, there is no evidence of systematic bias in the sample with matched address data. Nonetheless, I have subsequently weighted all subsequent models in this chapter and dissertation to correct for the differential likelihood students are to have address data. Using predicted values from this model, future models are weighted by the inverse of the likelihood that a student in the NCERDC data sample also has address data.

1.7 What types of students are most likely to opt out of their traditional public school assignments: Methods and Results

This section now addresses the chapter's primary research questions. Table 9 provides summary information about the public school types attended by the students who do and do not comply with their school assignments in a given year. In total, 32 percent of the sample does not follow their assignment.

Table 9: Types of public schools attended by compliers and non-compliers with school assignments

Type of School Attended	Compliers (n=64,715)			Non-Compliers (n=30,158)	
	Mean	Std. Dev.		Mean	Std. Dev.
Magnet School	0.07	0.26		0.35	0.48
Charter School	0	0		0.18	0.38
Year-Round School	0.03	0.18		0.07	0.25
Non-charter, non-magnet, non-year round public school	0.9	0.3		0.41	0.49

To determine the characteristics of students who do not attend their assigned schools, I run a basic logistic regression of the following form:

$$\text{Log}\left[\frac{DnC}{1-(DnC)}\right] = \beta_0 + \beta_1 * \text{StudentCharacteristics} + \beta_2 * \text{DistrictGrowth} + \gamma_{\text{District}} + \lambda_{\text{Grade}} + \alpha_{\text{Year}} + \text{error},$$

Where DnC (0/1) refers to whether a student "Does not Comply" with her school assignment.

This model is weighted by the inverse likelihood a student has address and assignment data in consecutive years according to the prior regression. Past literature indicates race, socioeconomic status, and students' academic abilities can contribute to the school choice decisions families make. To determine whether any of these factors contribute to parents' decisions not to follow their school assignment, analyses in this chapter include the following individual-level covariates: student race, FRL, the geography of the school to which a student was assigned, a students' standardized math test score, indicators for being LEP, female, and old for grade (defined as having a birthdate after the cutoff for students in that grade and year). Included in these predictions are charter school students, who are coded as non-compliers since they attend a choice school rather than their assigned school. Charter school students do not have address data, so for this analysis, they are coded as residing in the nearest traditional school district. For example, although it is possible that Mecklenburg charter students reside in an adjacent county, the analyses presented here assume that they are Mecklenburg County residents. Whether charter students are assigned to an urban, suburban, or rural school is based on the NCES code for the charter school's location.

Ideally, the student address would have been used but in the absence of that data, the fact that most charter students preference for that school is stronger when it is closer (Bifulco and Ladd 2007) justifies the imputation using the location of the charter school as students' residence. The logistic regression results for all of the independent variables can be found in Appendix A.

The following figures display the predicted probability of attending a non-assigned public school. Figure 4 demonstrates the differences by school district. Next are the main effects by geography, race, and free or reduced price lunch eligibility.

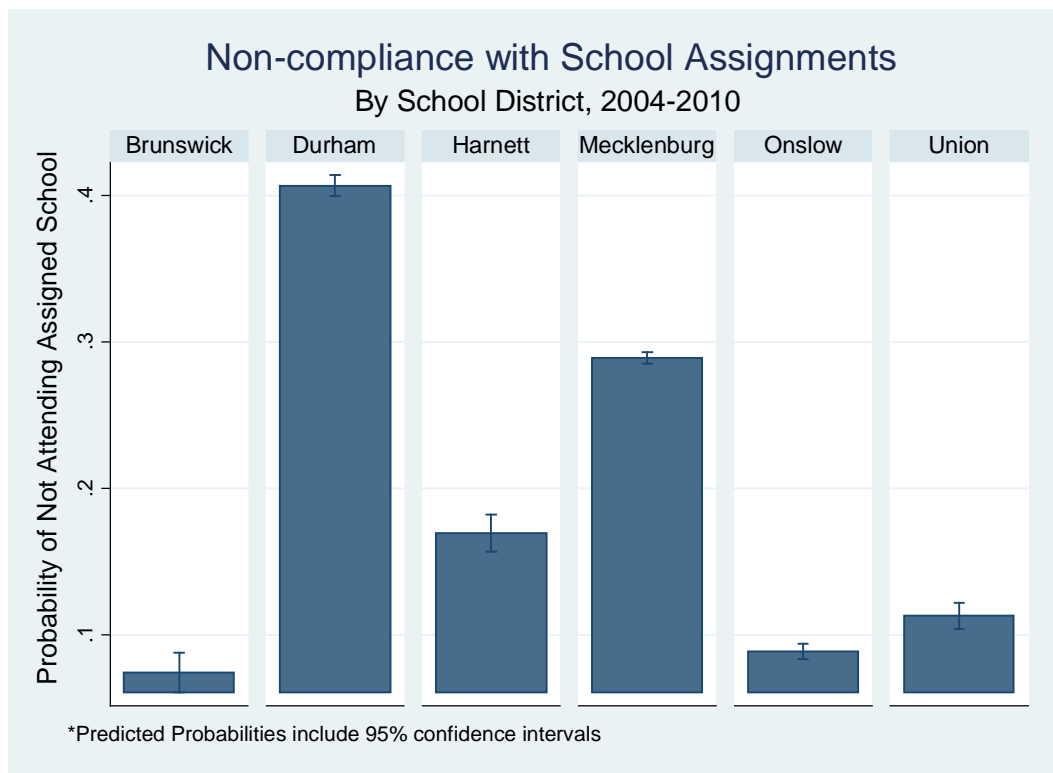


Figure 4: Weighted Predicted Probability of Noncompliance with School Assignments, by School District

The degree of noncompliance with school assignments clearly varies across school districts. Durham and Mecklenburg Counties have the most school choice options available in their counties; thus, it is not surprising to see high rates of noncompliance with school assignments (40 and 29 percent, respectively) in these districts. These two counties also have the highest percentage of students attending private schools. Charter and magnet students are not the only drivers of noncompliance; Harnett County has no charter, magnet, or year-round students, yet 18 percent of Harnett County third and fourth graders do not comply with their school assignments. These large differences across school district motivate the decision to include district fixed effects in all future models, for district-level idiosyncrasies in the availability and use of choice options clearly vary.

Figure 5 presents predicted probabilities by select covariates (assigned school geography, race, and FRL status) from the general noncompliance model. Over one-third of students assigned to urban schools in this sample do not actually attend their assigned schools. This rate is higher than and statistically different from both suburban and rural noncompliance. Many more school choice options exist for urban students and many take advantage of them. Many of these families likely could not afford a home with a more desirable school assignment, and as a result, have selected to opt out of their school assignment. This revealed behavior implies that many urban families are more content with alternate schools over their assigned schools.

By race, 38 percent of black students and 26 percent of Latino students do not comply with assignments. Only 17 percent of white students do not attend their assigned schools. The predicted probabilities for these three groups are statistically different from each other. This finding demonstrates that many minority families are not content with their assignments and a sizeable share are willing and able to act on that displeasure. Presumably, these families are using the school choice options available in light of their choice or inability to live in a more desirable school catchment area. Poor students (28%) are statistically more likely than non-poor students (24%) not to comply with their school assignments.

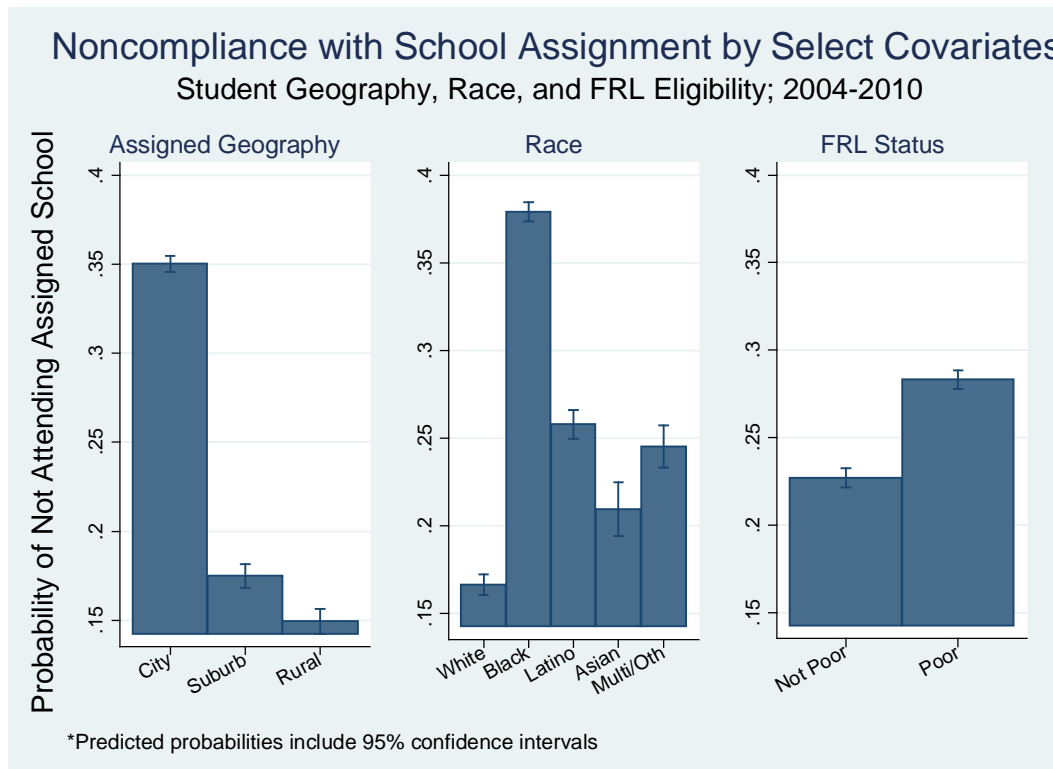


Figure 5: Weighted Predicted Probability of Noncompliance with School Assignments, by Geography of School Assignment, Student Race, and FRL Eligibility

The large differences and statistically significant patterns across geography and race motivate an additional set of interactive models. The next two figures demonstrate the statistically significant interactive differences for the following two models. These models predict whether a student "Does not Comply" (DnC), include the same student characteristics as the former model, and also introduce interactions between **geography and race**:

$$\text{Log}\left[\frac{DnC}{1-(DnC)}\right] = \beta_0 + \beta_1 * \text{StudentCharacteristics} + \beta_2 * \text{Geog} + \beta_3 * \text{Race} + \beta_4 * \text{Geog} * \text{Race} + \beta_5 * \text{DistrictGrowth} + \gamma_{\text{District}} + \lambda_{\text{Grade}} + \alpha_{\text{Year}} + \text{error},$$

and **geography and FRL** status:

$$\text{Log}\left[\frac{DnC}{1-(DnC)}\right] = \beta_0 + \beta_1 * \text{StudentCharacteristics} + \beta_2 * \text{Geog} + \beta_3 * \text{FRL} + \beta_4 * \text{Geog} * \text{FRL} + \beta_5 * \text{DistrictGrowth} + \gamma_{\text{District}} + \lambda_{\text{Grade}} + \alpha_{\text{Year}} + \text{error}.$$

Figure 6 depicts the weighted predicted probabilities of not attending the assigned school for the geography * race interactive model.

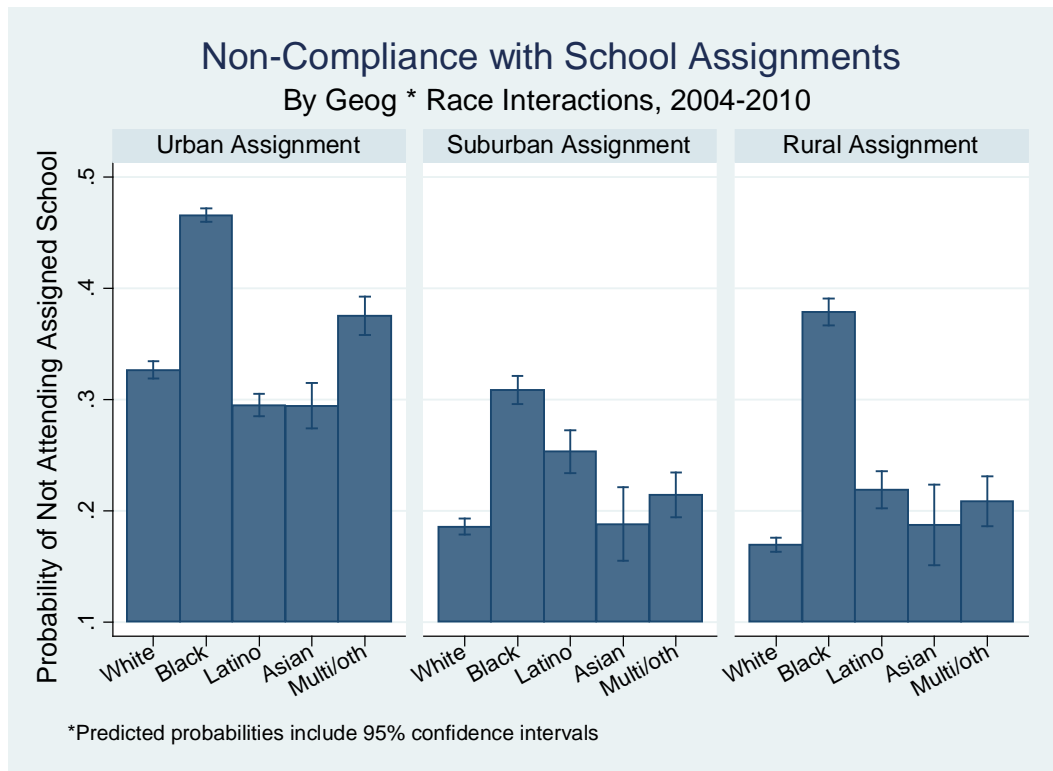


Figure 6: Weighted Predicted Probability of Noncompliance with School Assignments, by Geography*Race Interactions

Among all racial groups, there is more noncompliance in urban areas than the in both suburbs and rural areas. In fact, urban students of all races are more likely to attend a non-assigned school than non-black suburban and non-black rural students. In both suburban and rural areas, white students are less likely not to comply than are black or Latino students. These findings support the original pattern in which urban and black families are inferred to be more content with some alternate school choice option relative to the neighborhood school to which they are assigned according to their residence.

Figure 7 illustrates the predicted probabilities of noncompliance for the geography * FRL interactions. The original non-interactive

model produced statistically significant predicted probabilities in which poor students were more likely than non-poor students not to comply. By geography and poverty, the only statistically significant differences emerge in rural schools. Non-poor rural students are more likely than poor rural students to attend a non-assigned school. Urban students remain nearly twice as likely as suburban or rural students to attend a non-assigned school. These striking differences in opt out choices between urban and non-urban students again underpins two important points: (1) more school choice options are available to urban students and they often take advantage of them, and (2) many suburban and urban students may have not have as great an incentive to revise their school selection beyond selecting a residence linked to a preferred school.

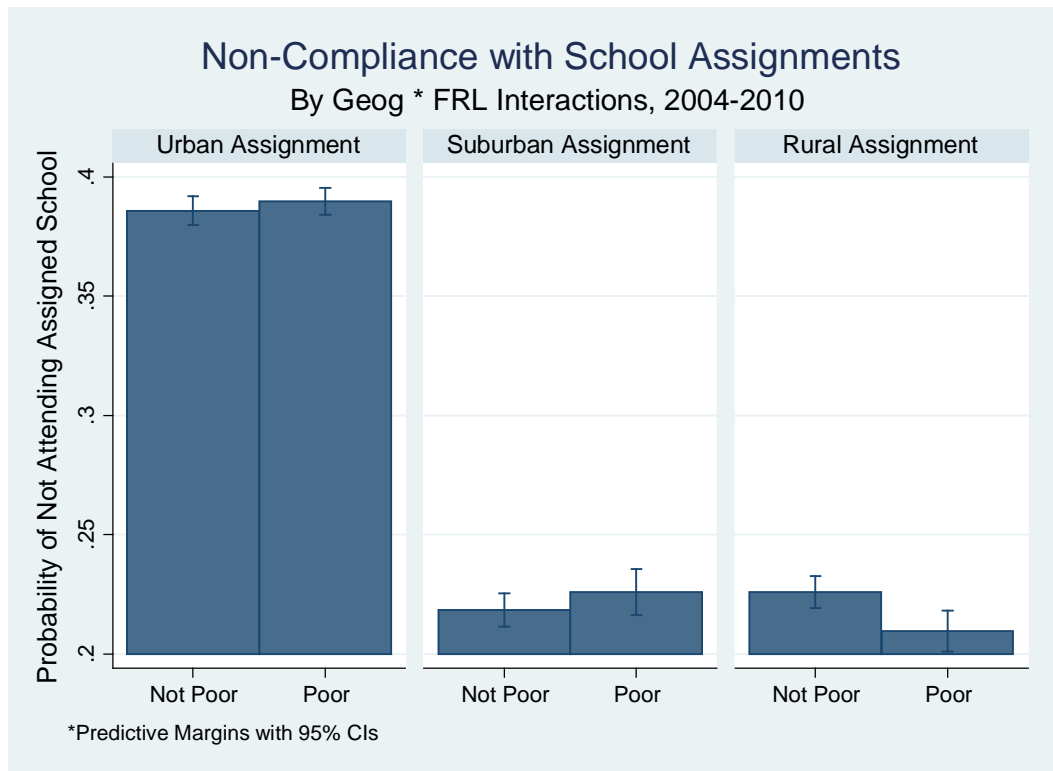


Figure 7: Weighted Predicted Probability of Noncompliance with School Assignments, by Geography*FRL Interactions

Next, I extend the models beyond merely predicting noncompliance to delineate the choices as being to explicit school choices versus to nonassigned traditional public schools. I use a multinomial regression, where the reference outcome is attending one's assigned school. Noncompliance subtypes include school choice options (charter, magnet, year-round) and other non-assigned traditional public schools. Main effect patterns for students attending explicit schools of choice largely mirror those of overall noncompliance and can be found in Appendix A⁸.

⁸ The largest difference with overall noncompliance is the lower likelihood of Latino students to attend schools of choice. Whites and Latino students each

To identify the interactive patterns by both **geography** and **socioeconomic status**, I run a weighted multinomial logistic regression of the following form and present the results in Figure 8:

$$\text{Log}\left[\frac{\text{Student Attends Non-Assigned Charter, Magnet, or Year Round School}}{(\text{Student Attends Assigned School})}\right] = \beta_0 + \beta_1 * \text{StudentCharacteristics} + \beta_2 * \text{Geog} + \beta_3 * \text{FRL} + \beta_4 * \text{Geog} * \text{FRL} + \beta_5 * \text{DistrictGrowth} + \gamma_{\text{District}} + \lambda_{\text{Grade}} + \alpha_{\text{Year}} + \text{error},$$

$$\text{Log}\left[\frac{\text{Student Attends Non-Assigned Traditional Public School}}{(\text{Student Attends Assigned School})}\right] = \beta_0 + \beta_1 * \text{StudentCharacteristics} + \beta_2 * \text{Geog} + \beta_3 * \text{FRL} + \beta_4 * \text{Geog} * \text{FRL} + \beta_5 * \text{DistrictGrowth} + \gamma_{\text{District}} + \lambda_{\text{Grade}} + \alpha_{\text{Year}} + \text{error}.$$

Among students who are assigned to urban schools, both poor and non-poor students are more likely to attend schools of choice than non-assigned traditional public schools. These urban students have access to school choice options and often take them. Both rural poor and rural non-poor students are more likely to attend schools of choice than traditional schools relative to their same-SES rural peers. Among suburban students, low SES students are far more likely to attend non-assigned traditional public schools than schools of choice. Overall, the lowest predicted noncompliance is among suburban poor to schools of choice and rural non-poor to non-assigned traditional public schools. Findings suggest non-poor families, despite having greater residential

have about a 13% likelihood to attend these explicit schools of choice. Poor and urban students have more school choice options and sometimes take them. Still, non-poor families, in addition to exercising residential choice, also take advantage of their school choice options. What differs in the main effect models is the low likelihood among suburban students and high likelihood among rural students to attend a non-assigned traditional public school. In addition, poor students are far more likely than non-poor students to attend a non-assigned traditional public school.

freedom, are still more likely to take advantage of explicit school choices than non-poor families. Presumably, some of these families intended to send their children to a school of choice when they chose their home, since they likely could have afforded a home in a different school attendance zone.

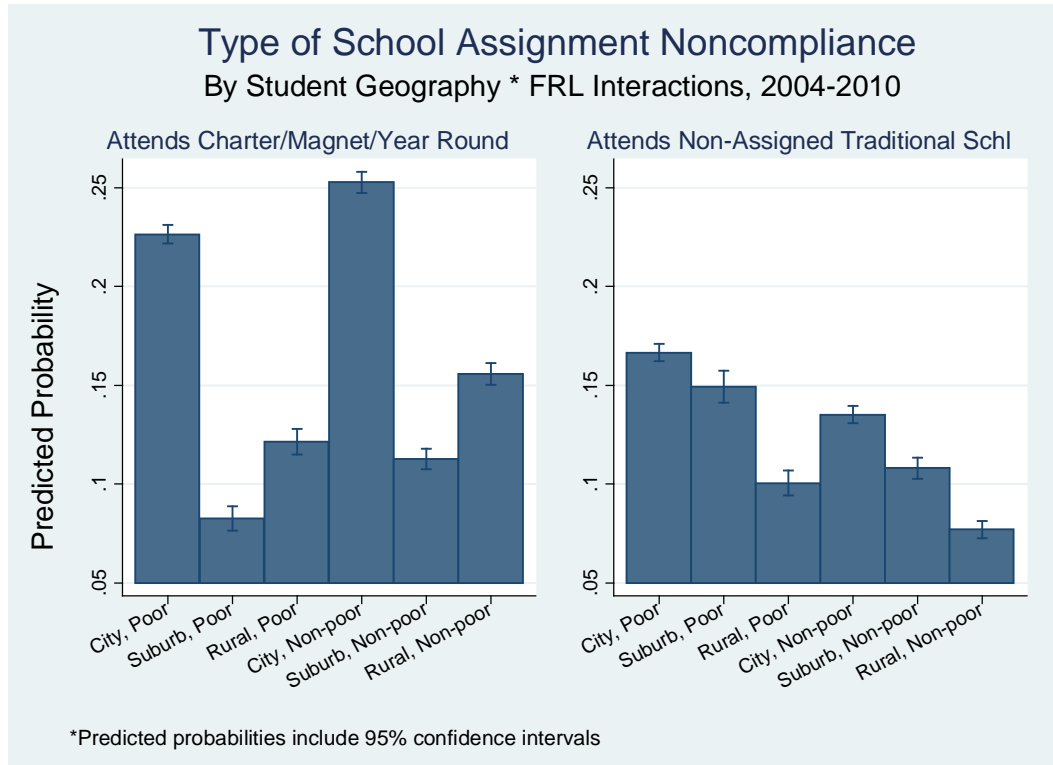


Figure 8: Weighted Predicted Probability of School Assignment Noncompliance Types by Geography * FRL Interactions

Considerable evidence suggests that schools would be more integrated if students attended their assigned schools rather than private, charter, or magnet schools (eg. Saporito and Sohoni 2006). However, less attention has been paid to the students who still attend traditional public schools that are not their assigned schools. For

this sample, I compare the dissimilarity indices⁹ by school district according to students' school assignments and the actual schools they attend. A dissimilarity index is one technique to measure segregation. In this case, it captures the percent of white students who would need to switch schools in order for all schools to be racially balanced. I also report segregation by socioeconomic status. Overall, the sample of schools would be more integrated by both race and FRL status if all students attended their assigned schools. While the degree of segregation varies by district (Table 10), this pattern holds for both race and SES.

The third column of Table 10 treats students who attend a non-assigned, non-explicit choice school as attending their assigned schools. In so doing, it calculates dissimilarity indices as though only the students attending schools of choice are opting out of their assignments. As most researchers do not have access to address and school assignment data, this calculation aims to determine how close the calculated segregation indices are when these non-explicit school choice decisions are not incorporated properly into segregation calculations. The results demonstrate nearly identical findings with the correct attribution of noncompliance. Therefore, it appears the increased school segregation is driven more by student attending explicit schools of choice than by opting out of assignments for other traditional public schools.

⁹ Of note, dissimilarity indices are highly correlated with exposure indices (Massey and Denton 1988; Massey, White, and Phua 1996).

Table 10: Dissimilarity indices by Race

County	If all Students Complied	Based on actually noncompliance	If schools of choice only were accounted as noncompliance
Brunswick	0.26	0.27	0.27
Durham	0.42	0.50	0.46
Harnett	0.15	0.17	0.17
Mecklenburg	0.59	0.60	0.60
Onslow	0.28	0.30	0.30
Union	0.45	0.46	0.46

Table 11 presents dissimilarity indices for urban, suburban, and rural schools for both race and FRL. These findings demonstrate that schools in each geographic type would be more integrated by race if all students attended their assigned schools. Urban and suburban schools would also be more integrated by SES if all students attended their assigned schools. However, rural schools are more integrated by SES in light of the school choices families make than they would be if all students attended their assigned schools.

Table 11: Dissimilarity indices by Race and FRL Status, by geography

Where students allocated in Calcs.	White-Nonwhite Comparison		FRL-non-FRL Comparison	
	Assign ments	Actual School	Assign ments	Actual School
Urban	.52	.56	.46	.48
Suburban	.58	.50	.33	.46
Rural	.46	.49	.43	.36

1.8 Conclusion and Discussion

The objectives of this chapter were to introduce the dataset, to identify the overall rate of school assignment noncompliance across student subgroups, and to use the revealed parent decision to make inferences about how content families are with their neighborhood schools. Since families do not all comply with school assignments, these revealed preferences for non-assigned schools are treated in this chapter as a reflection of the lower bound estimate of parents' discontent with the school assignment. The results are relevant for policy-makers both because they provide suggestive evidence about several correlates with parental dissatisfaction and also because the result of noncompliance with school assignments is that schools are more segregated by race and SES than in the absence of the choices.

In total, over 1/3 of urban and black students do not comply with their assignments and over 45 percent of urban black students do not attend their assigned schools. These high rates of noncompliance are substantively meaningful. At least among this sample, it seems quite clear that many families are not pleased with their assignments, which motivates them to send their children to a different public school.

It should come as no surprise that districts with explicit choice options have many students engaging in school choice options. Charter, magnet, and year-round schools are designed to increase choice options, and they serve that function. In addition to these high rates of noncompliance by attending schools of choice, many students attend non-assigned traditional public school that are non-explicit schools of choice. In this sample, over 10 percent of students attend a non-

assigned traditional public school. Sample districts were selected for having longitudinal, historical school attendance maps available and for enacting a school reassignment policy change during the study. These inclusion criteria likely do not contribute to these findings about noncompliance to a non-assigned traditional public school. Nonetheless, since these non-assignments are often case-by-case decisions at the discretion of the school district, it would be valuable to extend this research with a qualitative study to investigate the specific procedures for requesting different assignments. In so doing, it will be possible to both determine the extent to which the results can be extrapolated to other school districts and states, and to determine whether opportunities to attend a non-assigned school vary across observably different groups of students.

The results also demonstrate clear and substantively different patterns of students attending their non-assigned schools according to geography. Urban students are least likely to attend their assigned schools. Only about 55 percent of urban, black students in this sample actually attended their assigned schools. Most obviously, these patterns demonstrate that many parents--including nearly half of parents in some student subgroups--are more content with an alternate school over their assigned school. Of note, address data provide residential student locations in the fall, while students' school of record are identified in the spring. Thus, it is possible that within-year student mobility confounds some of the findings, particularly for highly mobile urban students.

Urban poor and non-poor students are more likely to attend an explicit school of choice than a non-assigned public school. Magnet schools and other schools of choice are more commonly located in urban areas, so these school choices are more easily available to urban students. Non-poor students are more likely than their poor peers to attend an explicit school of choice. This finding is driven by the noncompliance among suburban and rural non-poor families selecting explicit schools of choice at higher rates than the poor students in the suburbs and rural areas. Even though parents of suburban and rural families may have paid a housing premium for those locations, those families remain able to opt out of their school assignments and into explicit schools of choice.

Of all student subgroups, suburban poor students are the least likely group to attend a school of choice. This finding can either indicate that poor families who are able to live in the suburbs are pleased with the school options; alternatively, these poor suburban students might not be as connected to the necessary information and processes to attend a non-assigned school. The fact that non-poor suburban students are far more likely (12 versus 8 percent) than poor suburban students to attend an explicit school of choice likely suggests that the more advantaged suburban families are better equipped than the poor suburban parents to act on their school preferences.

The final function of this chapter is to motivate the next two chapters that study student reassignment. The following chapter will use the sample of students in this chapter who comply with their assignments. It will identify which students are reassigned when

districts alter their school attendance zones. The final dissertation chapter will continue to investigate the reassigned student subset to identify families' behavioral responses to reassignment.

Chapter 2: What Types of Students are most Likely to be Reassigned?

2.1 Introduction

This chapter identifies the types of students most likely to be reassigned when school districts enact reassignment plans. Models in this chapter predict how the demographic characteristics of children are associated with the odds of experiencing (a) any reassignment, and (b) reassignment to a school of lower quality relative to students' current schools. I address these research questions by examining third and fourth grade students in the same sample of school districts in North Carolina as detailed in Chapter 1. Results demonstrate that suburban non-poor students are least likely to be reassigned to any school or to a school of lower quality while rural non-poor students are the most likely student subgroup to be reassigned. This research contributes to broader literature of two types. First, social science literature highlights how middle class families work the education system to their advantage. This research provides evidence of yet one more mechanism through which advantaged parents create and maintain better educational opportunities for their children. Second, school districts serve many important functions for schools, teachers, and students. This research emphasizes a common schools district policy that directly and substantively impacts students.

Where families live generally determine the school assignments for their children. At the time parents choose to buy or rent housing, most families recognize the school to which their children will be assigned. The former chapter demonstrates that many families do not

comply with these school assignments. In addition, these school assignments are not fixed. Districts sometimes change school assignment plans, and not all students are equally likely to be reassigned. Student reassignments are most common when schools open or close, as these structural changes necessitate some students to be reassigned to the new schools or from the closed schools. In the last decade in the United States, about 31 percent of school districts grew annually by at least 1 percent and about 15 percent of districts shrank by at least 1 percent.¹ While districts have little control over fluctuations in student populations or demographics, they must predict and respond to these common population changes to distribute students among their schools most effectively. Reassignments sometimes also occur to balance student numbers or characteristics across existing schools. School reassignment policies can be quite controversial.

The controversial nature of reassignment plans is not surprising because there are good reasons for families to be concerned about them—reassignments mean that children have to change schools, which can be disruptive, and some reassignments may be to lower quality schools. While district policy makers create and implement reassignments, certain types of families are likely to be more vocal in the decisions than others. Policymakers may also make decisions intentionally to affect certain students more than others.

Reassignments weaken the tie between a students' residential location and the school she is assigned to attend. This matters

¹ Author's calculation from National Center for Education Statistics' Common Core of Data for School Districts.

because reassignments might either ameliorate or exacerbate the differences in educational opportunities between students from advantaged and disadvantaged families. This chapter investigates the characteristics of both reassigned students and the schools to which they are reassigned. Reassignments affect a non-negligible portion of students, and the policies have the potential to generate large differences in educational opportunities for affected and unaffected students.

Parents can influence policy in an attempt to secure the best opportunities for their children. Following reassignments, parents can also opt out of the assignments (as was demonstrated in the former chapter) or move residences. These explicit parental choices will be the subject of the following chapter. This chapter uses the district policies and the change in relative school quality for students to make inferences about the level of political engagement of parents. Since about 1/3 of students in the sample have already made alternate school choice decisions, reassignment policies are less likely to affect that group. Therefore, the analyses in this chapter are restricted to the sample of students who complied with their initial assignment.

Reassignment policies are particularly relevant for this group because their initial compliance suggests that in the absence of a policy change, they would be more likely to continue to attend their assigned schools than families who already opted out of their assigned schools.

Findings about the likelihood and type of school reassignment allow inferences to be made about how involved parents are in the political process. Based on the outcomes, it will be possible to make

inferences about who has power at the local level and who can exert that power to produce more advantaging student opportunities. The inferences are also relevant for policymakers, for the implications speak to the educational opportunities available for observably different families. The following chapter will explore how households respond to reassignment.

2.2 Reassignment of Students

School districts set assignment policies, which determine the schools students attend. The fact that districts sometimes must change these school assignment plans is the subject of this chapter. A student's school assignment may change for three primary reasons. First, students can make promotional moves. For example, when a student graduates from a K-5 school to a 6-8 school, she will be reassigned from her neighborhood elementary school to her neighborhood middle school. Second, a student might move residences between years. These moves commonly result from upsizing or downsizing of a family residence, divorce, parental job loss, or they may be driven by parents' concerns about school quality. While it is possible to make a geographic move within the catchment area of a student's former school, longer distance moves often lead to reassignment. Third, a student might remain in the same residence between years yet experience reassignment as consequence of explicit policies enacted by school districts, without choice on the part of the student's family. This chapter will focus on this final type of reassignment that is caused by school district policies.

2.2.1 Reassignment Policies in Non-promotional grades

School districts reassign students for two major reasons. First, when a district grows or shrinks in population, districts may reassign students to avoid overcrowding or underutilization in schools affected by the population changes. Second, districts may elect to open or close schools, which inherently requires that some students transfer into the new school or out of a closing school. When reassignments are needed, districts may reassign students to promote balance in the composition of the students in schools. Although less common than balancing plans for total size, districts have balanced students by race, socioeconomic status, and achievement. When districts enact such balancing initiatives, it necessarily follows that the subset of students that are reassigned will be selected by some observable characteristic. Before implementing new school assignments, school districts often provide for some public debate on the topic. Figure 9 demonstrates a simplified form of the process. Based on the quality of the school to which a student is reassigned, inferences can be made about whether parents were involved in the political process to lobby on behalf of their children.

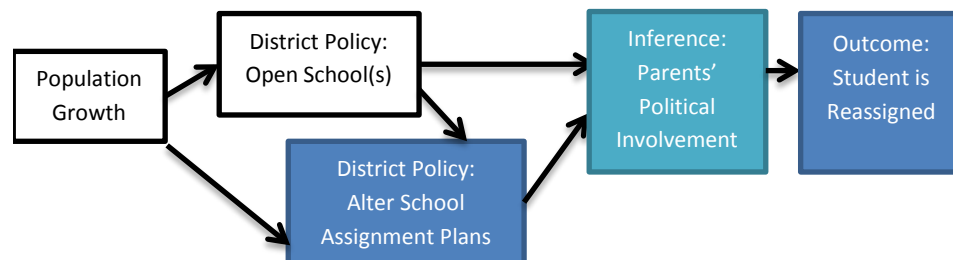
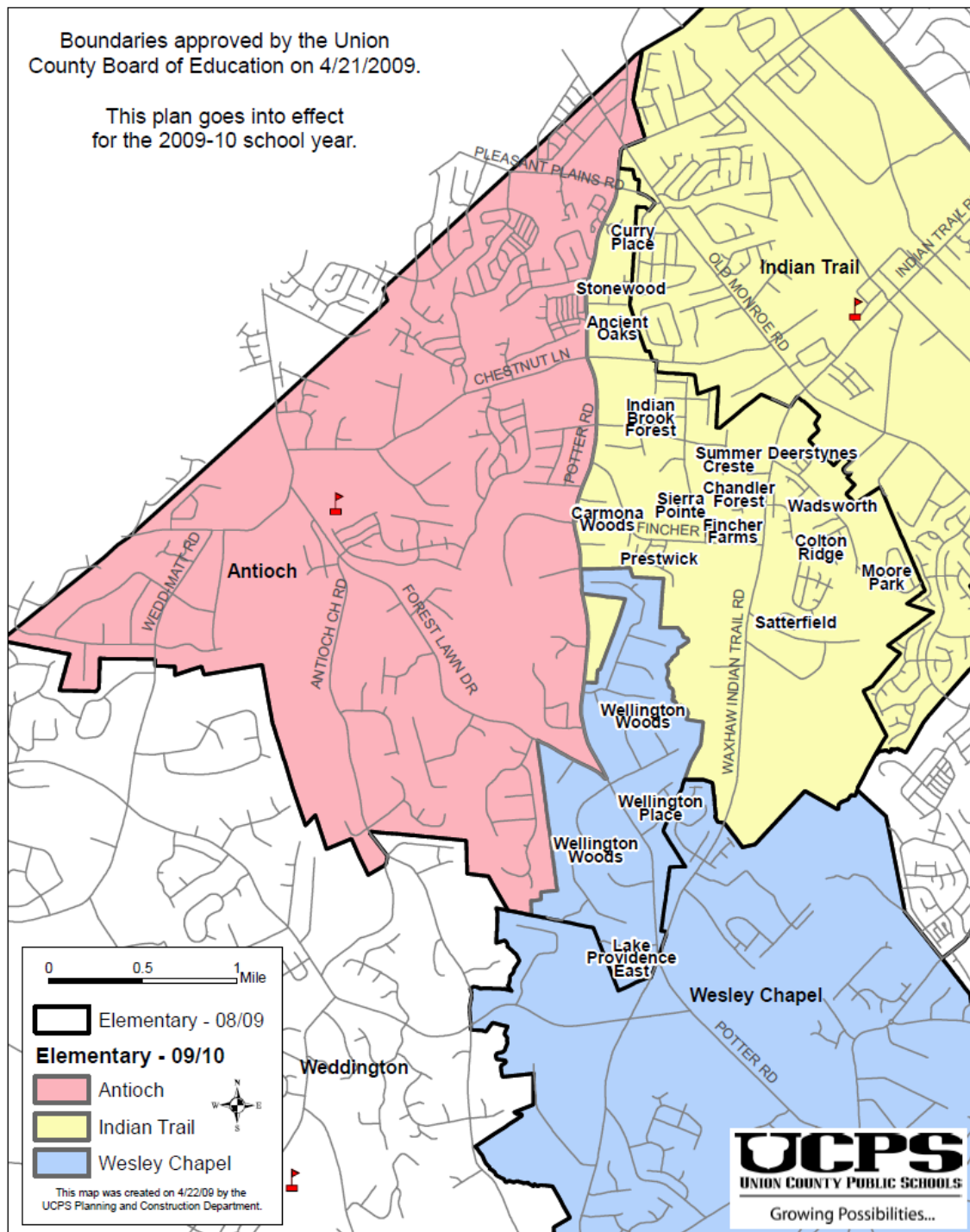


Figure 9: Identifying Parents' Political Involvement Based on School District Reassignment Outcomes

2.2.2 Illustrative Reassignment Policy

Between the 2008-09 and 2009-10 school years, Union County, North Carolina implemented a school attendance boundary change, illustrated in Figure 10. 2008-09 school assignments are delineated by thick black lines and the colorful regions designate the 2009-10 assignments. While the majority of Antioch Elementary School students retained their assignments between years, some were reassigned to Indian Trail Elementary School and others were reassigned to Wesley Chapel Elementary School². Families that purchase homes likely cannot predict with confidence the likelihood that they will be reassigned in the future. In addition, these reassignment plans only are discussed and decided at school board meetings in the year prior to the policy change. This final plan in Union County was enacted less than 6 months prior to the first day of school in the next school year. Given the timing of these policies, many families likely do not consider the risk of reassignment when they select a residence.

²This reassignment plan even produced a very small non-contiguous zone, though that is not the norm across the district. This small, non-contiguous area reassigned to Indian Trail Elementary school is substantively very different from the district-wide, purposeful socioeconomic balancing in school districts such as Wake County. Thus, Union County Elementary Schools were not excluded from analysis in this chapter.



(http://fpc.ucps.k12.nc.us/documents/Approved_Antioch_Reassignment.pdf)

Figure 10: Union County 2008/9-2009/10 Elementary School Reassignments

This chapter investigates such reassignment cases, using a subsample of school districts in North Carolina from 2003/04-2009/10. It examines which students are reassigned, and describes the observably different characteristics of reassigned versus non-reassigned students. Further, it focuses on reassignments of different subtypes, including reassignments to schools with changing relative proportions of novice teachers and poor students. While there is no consensus about how to define changes in school quality³, this chapter describes reassignment subtypes as "worse" if they are to schools with more novice teachers and more poor students relative to students' original schools.

This chapter focuses on families with a strong residence-school link. Similar to the former chapter, it excluded families who use private schools. In addition, based on the findings from the former chapter, it excludes students who do not attend their assigned school⁴ in the year prior to reassignment policies. While the choices made by

³ Education policy researchers have defined school quality in numerous ways, including pupil-teacher ratio, average term length, relative pay of teachers, test scores, parents' education, parents' income, school size, graduation rates, teacher turnover, and more. Needless to say, there is no consensus on how to define school quality. I have selected a crude, yet observable, measure that both advantaged and disadvantaged parents are likely to notice.

⁴ Chapter 1 demonstrated that many families opt out of their school assignments. (The characteristics of these students can be explored in greater depth in the chapter.) Although these students remain in the public school system, the fact that they have already made a school choice decision implies that they are more content with their school of record than their assigned school. The purpose of this chapter is to identify parental engagement, and the relevant sample is the traditional public school subset of students who complied with their assignments. Students who have already opted for a non-assigned public school are less likely to be affected by reassignments. This chapter serves to document which initially compliant public school students are reassigned, regardless of whether they follow their assignments in the subsequent year. Whether students subsequently follow reassignments are addressed in the following chapter.

these families are interesting, they are outside the scope of this work.

2.2.3 The role of parents in influencing school district reassignment policies

Advantaged parents can be active, opinionated, and powerful stakeholders influencing school district decisions. For example, suburbanites are likely to fight back when they perceive a threat to their schools (Ryan and Heise 2002). Disadvantaged parents tend to have more barriers to school involvement, including less flexible work schedules, poor transportation options, and neighborhood stresses (Hill and Taylor 2004). Further, minority immigrant parents are more likely than native-born parents to report more barriers to participating in school events (Turney and Kao 2009).

Table 12 provides an illustrative example of voting in a local North Carolina school bond vote. Only about 5 percent⁵ of eligible voters in Johnston County voted in the local school bond election in 2005. The voting rates by race are disproportionately higher for whites, so the opinions of white voters, often the more advantaged population subgroup, are more likely to have affected the outcome. The higher engagement of whites in the school bond vote extends to other aspects of local school politics. Higher income parents and white parents are more likely to attend school events, class events, and general school meetings than are poorer parents and Black or Latino

⁵ In March of 2012, Johnston County had 101,342 registered voters (<http://www.johnstonnc.com/joconcelelections/>). Since I do not have precise information on the demographics of registered voters in Johnston County in 2005 or 2012, I compare the 2005 voters to 2000 and 2010 decennial census totals and to the 2012 registered voter counts.

parents (U.S. Department of Education 2011). By inference, this small voting minority likely exerts disproportionate influence on other school-related issues, such as student reassignment policies.

Table 12: Illustrative NC example of local voting in municipal/school bond elections

School Bond Election, 2005	Number	% of local voters	2000 racial %s in county	2010 racial %s in county
Total Number of Voters	5,705			
White Voters	4,905	0.86	0.78	0.74
Black Voters	321	0.06	0.16	0.15
Did not specify race	434	0.08		
Self-identified as Latino	4	0.00		
Not Hispanic, Not Latino	4,980	0.87		
Ethnicity not specified	721	0.13	0.08	0.13

In addition to differential parental influence on district policies, school district policies can differentially affect parents. For example, some political boundaries have been gerrymandered to change the relative voting strength of different racial groups, most commonly to suppress the voice of minorities (eg. Guinier 1994; Barabas and Jerit 2004). School district decisions to change school attendance boundaries may be seen as analogous to political gerrymandering. Redistricting differs from gerrymandering because gerrymandering affects political inputs (voters' voices), while school redistricting affects outputs (access to school quality). Similar to gerrymandering, redistricting has been shown to disenfranchise nonwhites and to benefit whites (Saito 2009), particularly in suburbia (Danielson 1976). For example, numerous court findings have suggested that school boards have "created and altered attendance zones... in a manner which has had the

natural, probable and actual effect of continuing black and white pupils in racially segregated schools" (Wolf 1981, pp. 191). These cases provide suggestive evidence of the interplay between school assignments and policy involvedness. This chapter extends these examples to the case when these school attendance zones change.

2.3 Data

This chapter uses the same data sources and convenience sample of school districts and years as the former chapter (noted in Figure 2 and Table 1). Given the substantive nature of these research questions, the new sample only includes the students who complied with their initial school assignments. I use the same sampling weights I constructed in Chapter 1, or the inverse likelihood a student has address data and is in the sample in consecutive years. Thus, the results can be extrapolated to all students in the sample districts.

All districts evaluated in this sample implemented a reassignment plan at some time during the interval studied. In theory, any student in such a district could have been reassigned. In practice, some areas of a district, and therefore certain students, are more or less likely to be affected by reassignment. Table 13 provides details about the characteristics of the students in the sample districts and years in the following analyses⁶.

⁶ I also ran models using a whittled sample that included only those students who attended schools where some students were reassigned. Results were substantively similar to what I report and I omit these details for brevity.

Table 13: Characteristics of sample, omitting students who did not comply with initial school assignments

	Observations	Mean	Std. Dev.
Student Variables			
White	64,715	0.46	0.50
Black	64,715	0.31	0.46
Latino	64,715	0.14	0.34
Asian	64,715	0.03	0.18
Multi, Other, or Missing Race	64,715	0.06	0.24
Free or Reduced Price Lunch Eligible	64,715	0.45	0.50
Standardized Math End of Grade Score	64,715	0.03	1.02
Missing Math EOG Score Indicator	64,715	0.02	0.16
Limited English Proficient	64,715	0.10	0.30
Missing LEP Indicator	64,715	0.00	0.04
Female	64,715	0.50	0.50
Old for Grade	64,715	0.16	0.37
Missing Birthday	64,715	0.02	0.15
Third Grade	64,715	0.48	0.50
Fourth Grade	64,715	0.52	0.50
Type of School Assignment			
Assigned to Urban School	64,715	0.49	0.50
Assigned to Suburban or Town School	64,715	0.25	0.43
Assigned to Rural School	64,715	0.26	0.44
District Variable			
Lagged 5-year District Student Population Growth	64,715	3.27	1.93

2.3.1 Constructing reassignment variables

To construct the reassignment indicators, I merged together student geographic information with district geographic maps on the current and the next year's assignments. First, I generated an "assigned school this year" variable based on a students' current geographic location. Given that the sample is comprised only of

initial compliers, this "assigned school this year" variable is equivalent to the students' school of record in the year prior to reassignment. Next, still using a students' current geographic location, I determined her assignment the next year. Then, I constructed a binary indicator to represent whether a students' assignment this year differs from her assignment next year.

2.4 Who is reassigned: Methods and Results

This section turns to the primary research question. Logistic regressions model the associations between reassignment and the observable characteristics of students. All models include fixed effects for both school districts and for the students' grade in the initial year to control for differences across districts and by grade. The models would not converge with district, grade, and year fixed effects, likely due to the limited nature of reassignment policies in some districts as being only in a single year. As a results of the non-convergence, year fixed effects were omitted from the analyses in this chapter.

2.4.1 General Model

To predict whether a student is reassigned to a different school between years, I employed several weighted logistic regression in the following basic form, controlling for initial student and school characteristics, district growth, and district and initial grade fixed effects:

$$\text{Log}\left[\frac{\text{Student is Reassigned}}{1-(\text{Student is Reassigned})}\right] = \beta_0 + \beta_1 * \text{StudentCharacteristics} + \beta_2 * \text{InitialSchoolCharacteristics} + \beta_3 * \text{DistrictGrowth} + \gamma_{\text{District}} + \lambda_{\text{Grade}} + \text{error}.$$

The regression is weighted by the inverse of the probability of a student having matched address data and is restricted to include only the students who complied with their initial assignments. By employing this weighting strategy, inferences from the model can be applied to all public school students in the sample districts. The results from this model demonstrate which types of students are more likely to be reassigned relative to non-reassigned students. The regression results from this basic, non-interactive model can be found in Appendix B. All figures present weighted predicted probabilities and control for the entire set of covariates from the above model. Figure 11 depicts the predicted probabilities of reassignment by school district. A minority, but not negligible group of students is reassigned. These rates of reassignment range from about 2 percent in Mecklenburg County to 16 percent in Brunswick and Union Counties.

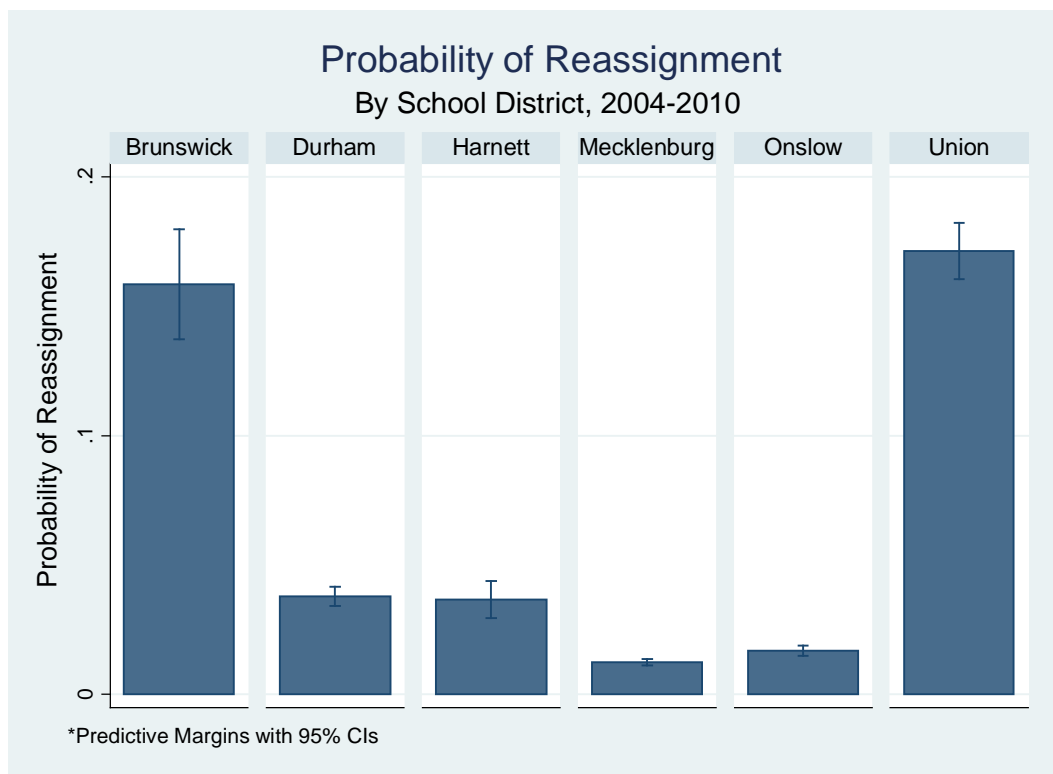


Figure 11: Weighted Predicted Probability of Reassignment, by District, 2004-2011

Appendix B presents the predicted proximities of select main effects from the general model. Interactive results by geographic location provide more substantively meaningful results than the main effects, so that model follows. Rural areas are often at the fringe of a district and have fewer schools in the area than suburban and urban areas. When growth leads to a new rural school, a larger proportion of students might be reassigned as a consequence. Urban areas have high population density, which might produce a high impact of reassignment policies on students attending urban schools. Suburbs are often have residential stability since families have moved there “for the schools.” Districts might therefore attempt to accommodate population

fluctuations within the existing suburban schools rather than enacting reassignment plans that affect suburban students. Figure 12 presents interactive predicted probabilities according to the geography of students' assignments using an interactive model of the following form:

$$\text{Log}\left[\frac{\text{Student is Reassigned}}{1-(\text{Student is Reassigned})}\right] = \beta_0 + \beta_1 * \text{StudentCharacteristics} + \beta_2 * \text{InitialSchoolCharacteristics} + \beta_3 * \text{Geog} + \beta_4 * \text{FRL} + \beta_5 * \text{Geog} * \text{FRL} + \beta_6 * \text{DistrictGrowth} + \gamma_{\text{District}} + \lambda_{\text{Grade}} + \text{error}.$$

In suburban and rural assignments, clear, statistically, and substantively meaningful differences occur. In suburban areas, poor students are much more likely to be reassigned than non-poor students. In rural areas, the non-poor students are the most likely to be reassigned. These patterns suggest that there might be a different set of parental involvement and influence in the reassignment process in the two settings. Specifically, suburban non-poor students are able to avoid reassignment. Recall that the school districts in this sample are very large and all contain both suburban and rural schools. Therefore, when districts alter their school assignments, it is possible that each policy might affect students in different geographic contexts. In a zero-sum framework, the suburban families possibly avoid reassignments at the expense of the rural non-poor. In urban areas, only a marginal difference (at the 90 significance level) emerges in which non-poor students are more likely to be reassigned than poor students.

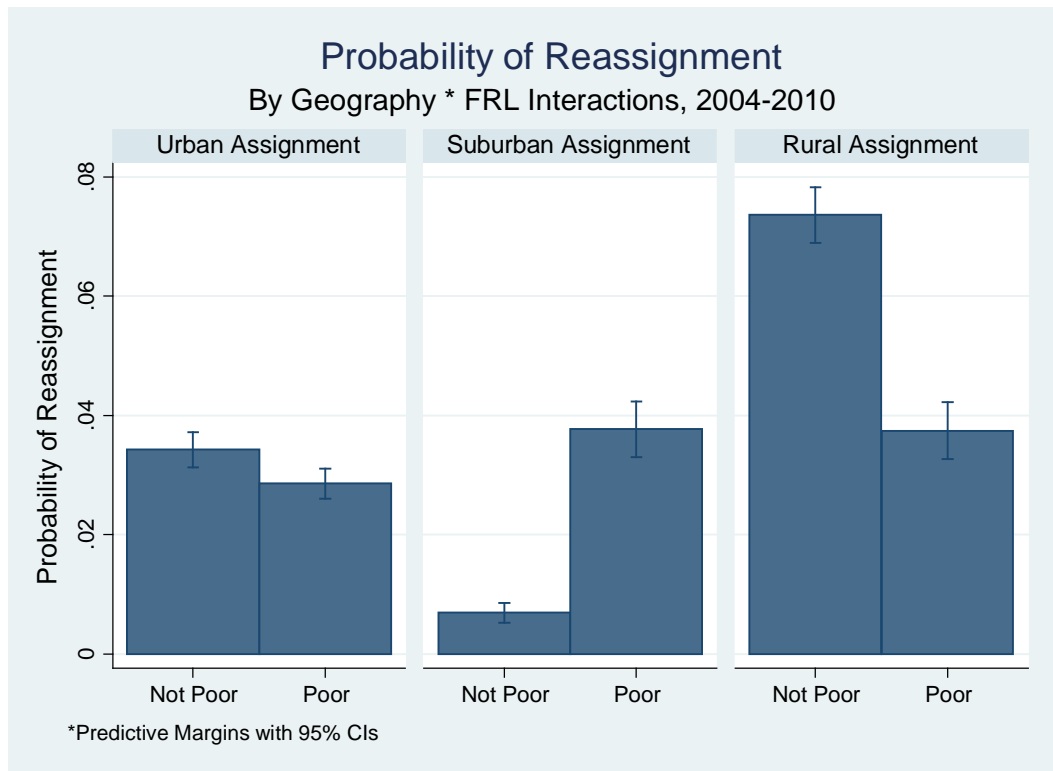


Figure 12: Weighted Predicted Probability of Reassignment with Interactions between Geography and FRL Eligibility

Suggestive evidence from the very low rate of reassignment among the most advantaged group, the non-poor suburban students, indicates that families largely prefer stable educational contexts for their children. Since reassignments likely lead to disruptive school moves, reassignments are assumed to be predominantly undesirable. Indeed, the majority of reassignments are to schools of lower quality. Among reassigned students, 63 percent are reassigned to schools with a higher proportion of novice teachers, and 56 percent are reassigned to schools with higher rates of student poverty. In the next section of this chapter, the models are extended into reassignment subtypes. The intent of that extension is to identify whether observably different

students are more likely to be reassigned to schools of lower quality, which will be defined as being reassigned to a school with both more novice teachers and a higher rate of student poverty at the newly assigned school.

2.5 Among reassigned children, who is reassigned to lower or higher quality schools: Methods and Results

We have seen that student characteristics are associated with the likelihood of reassignment. Just as these students are heterogeneous, so are their potential reassignments. I therefore generated reassignment subtypes to help determine whether certain student subgroups are reassigned to schools of lower quality. This indicator was constructed based on the characteristics of students' assigned school in the current year relative to the current year's characteristics of her next year's assignment. By generating the construct in this manner, the regressions capture the counterfactual case for reassigned students because the models compare the characteristics of a students' newly assigned school with where she would have been assigned had she not been reassigned. Further, using current year characteristics in the construction prevents incorrectly attributing the dynamic results of the policy to the change variables.

Although reassignment to a new school can be disruptive, if the new schools has better resources than existing schools, then moving to that school can be an improvement over the status quo. Reassignment to a worse school is an indicator variable that is defined as having both a higher percentage of novice teachers and a higher percentage of

students in poverty in the school⁷. As the following models include only students who were reassigned, students that are reassigned to a worse school are being compared to reassigned students to school that do not have *both* a higher percentage of poor students in the school and a higher proportion of novice teachers. This sample is now 3.4% of the initial student compliers. Tables 14 and 15 provide summary statistics about the characteristics of this reassigned subsample, including student demographics and the quality of the reassignments. Of note, fewer than ¼ of reassigned students are reassigned to a better school and just over 1/3 are reassigned to a worse school.

Table 14: Reassignment Subtypes among Initially Compliant Sample

Types of Reassignment	Observations	% of Total	% of Reassigned
Not Reassigned	60,922	96.6%	0.0%
Reassigned to Better School	471	0.8%	21.8%
Reassigned to Worse School	762	2.0%	35.3%
Reassigned to Other School	926	3.4%	42.9%

Table 15: Characteristics of Reassigned Subsample

	Observations	Mean	Std. Dev.
Student Variables			
White	2,159	0.51	0.50
Black	2,159	0.30	0.46
Latino	2,159	0.11	0.31
Asian	2,159	0.03	0.17
Multi, Other, or Missing Race	2,159	0.05	0.22
Free or Reduced Price Lunch Eligible	2,159	0.41	0.49

⁷ This measurement, while crude, provides for an intuitive interpretation of results. No single variable fully captures school quality, so this chapter uses a composite of two key factors assumed to influence students and their parents' perceptions of school quality. Since reassignments appear to be generally undesirable, the motivation of the composite measure is to identify the very worst of the reassignments. The kernel densities of the distribution of these two change variables can be found in Appendix B.

Standardized Math End of Grade Score	2,159	0.06	1.03
Missing Math EOG Score Indicator	2,159	0.01	0.10
Limited English Proficient	2,159	0.07	0.26
Missing LEP Indicator	2,159	0.00	0.05
Female	2,159	0.51	0.50
Old for Grade	2,159	0.15	0.36
Missing Birthday	2,159	0.01	0.10
Third Grade	2,159	0.51	0.50
Fourth Grade	2,159	0.49	0.50
Type of School Assignment			
Assigned to Urban School	2,159	0.43	0.50
Assigned to Suburban or Town School	2,159	0.12	0.33
Assigned to Rural School	2,159	0.45	0.50
District Variable			
Lagged 5-year District Student Population Growth	2,159	4.10	2.88

Using this indicator for reassignment to a worse school, I run logistic regressions to explore whether observably different students were reassigned to worse schools. These weighted logistic regression models only include the reassigned student subsample. Consistent with the earlier general reassignment models, these weights were constructed as the inverse probability that a given student has geocoded address data and is also reassigned. These logistic regressions are of the following general form and main effects are presented in Appendix B:

$$\text{Log}\left[\frac{RtWS}{1-(RtWS)}\right] = \beta_0 + \beta_1 * \text{StudentCharacteristics} + \beta_2 * \text{SchoolCharacteristics} + \beta_3 * \text{DistrictGrowth} + \gamma_{\text{District}} + \lambda_{\text{Grade}} + \text{error},$$

where RtWS means "Reassigned to Worse School."

Most notable among the main effects are that reassigned suburban students are far less likely than their urban or rural student peers to

be reassigned to a worse school. Yet again, and consistent with the body of literature on advantaged families, these suburban students appear best equipped to prevent undesirable reassignments. These differences are highly statistically significant. Again, these large geographic differences motivate interaction models.

Figure 13 presents the interactive differences between **geography** and **race** based on the following model:

$$\text{Log}\left[\frac{RtWS}{1-(RtWS)}\right] = \beta_0 + \beta_1 * \text{StudentCharacteristics} + \beta_2 * \text{InitialSchoolCharacteristics} + \beta_3 * \text{Geog} + \beta_4 * \text{Race} + \beta_5 * \text{Geog} * \text{Race} + \beta_6 * \text{DistrictGrowth} + \gamma_{\text{District}} + \lambda_{\text{Grade}} + \text{error},$$

where RtWS means "Reassigned to Worse School."

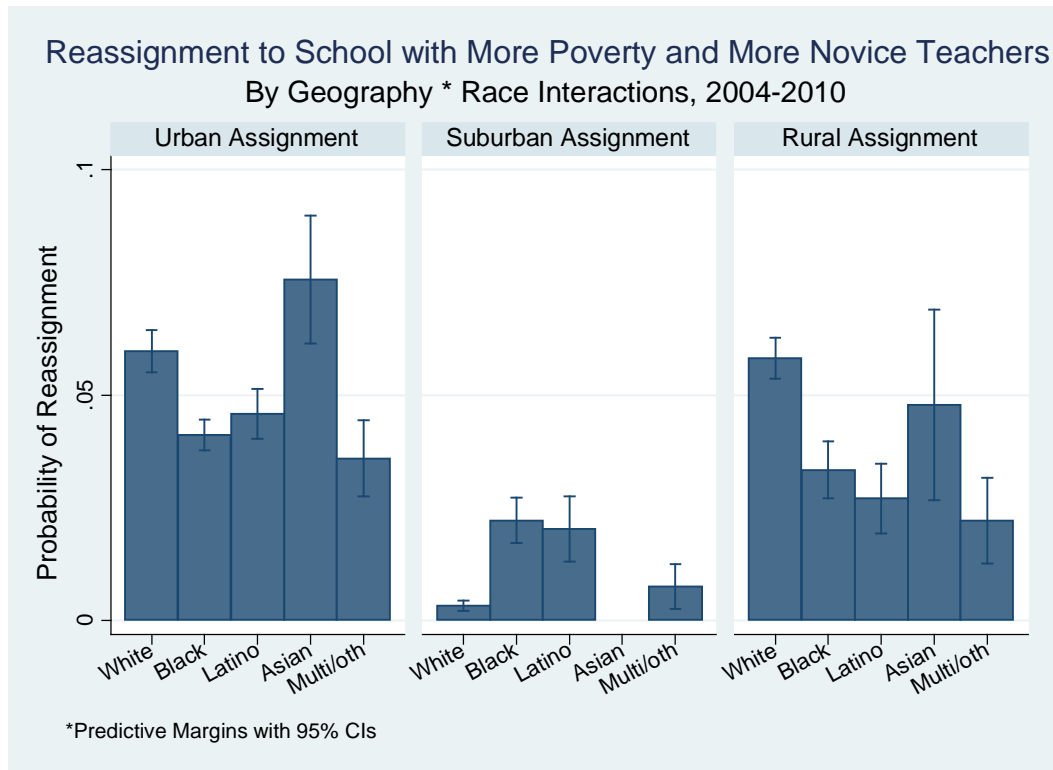


Figure 13: Weighted Predicted Probability of Reassignment to Worse School, by Geography * Race Interactions, 2004-2010

The most important finding from the figure above is the near-zero likelihood of white suburban students to be reassigned to a clearly worse school. Although black suburban students are more likely than whites to be reassigned to a worse school, they are less likely than whites and blacks in both urban and rural schools to be reassigned to worse schools. This finding implies that black suburban students have a protective benefit from the advantaged white suburban students, and benefit from the security of the stable suburban environment. However, when adverse reassignments affect suburban areas, black students are likely to be affected whereas white students are not.

The fact that white, suburban students appear best able to avoid undesirable reassignments is consistent with existing literature that emphasizes ways in which advantaged families can construct the most desirable opportunities for their families. These findings extend that work by demonstrating yet another avenue through which these findings occur.

No differences in the likelihood to be reassigned to a worse school emerge between urban black and urban Latino students. Rural patterns more closely resembled the urban setting than the suburban case: white students were more likely than black or Latino students to be reassigned to a school of lower quality. This finding is somewhat surprising because white students and their parents are generally assumed to be a very advantaged group. Therefore, the fact that they are more likely to be reassigned to a worse school than their black and Latino urban peers is surprising. I present three plausible explanations for this finding. First, it is possible that the urban

whites initially attended the best schools in the city, so the new schools were more racially diverse and had more novice teachers as compared to their uniquely good urban school. This regression to the mean possibility is tested by examining the school-level math proficiency for reassigned urban white, black, and Latino students.

Figure 14 presents achievement data for the original schools reassigned urban white, black, and Latino students attended. The figure demonstrates that reassigned white students indeed attended schools with higher initial student achievement. This finding confirms the importance of including initial school controls in the models. Despite the inclusion of these independent variables, white students are more likely to be reassigned to worse schools.

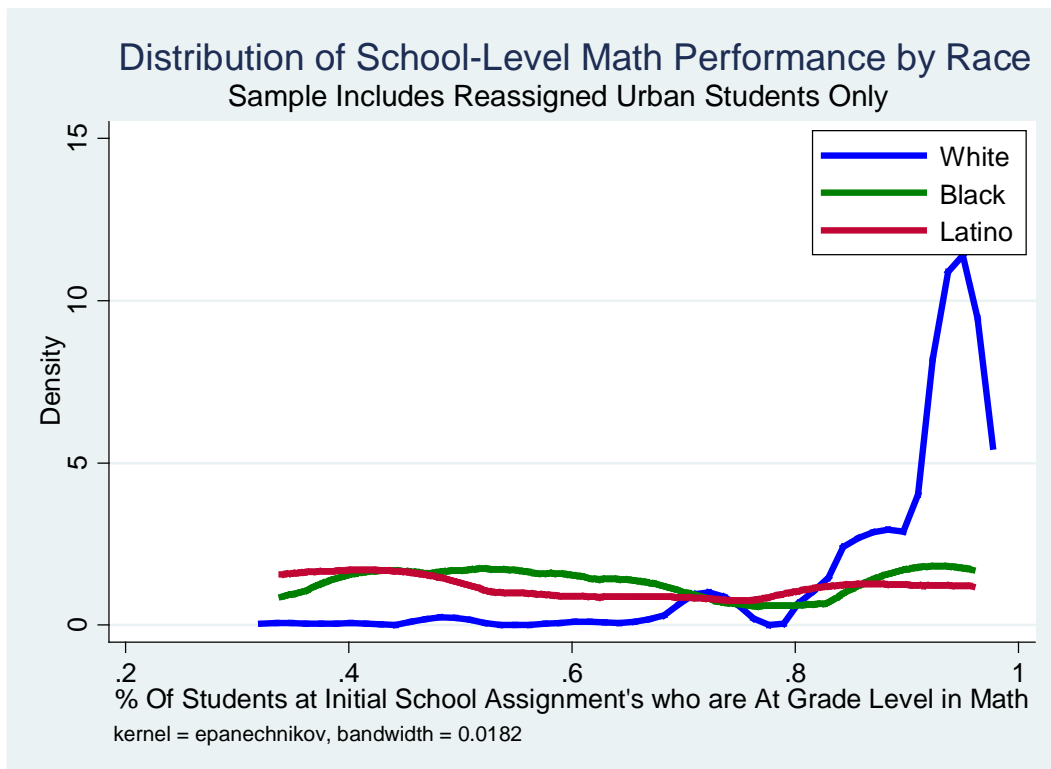


Figure 14: School-wide Test Score Distribution among Reassigned Urban Students, by Race

Second, it might be the case that the most advantaged whites families live in the suburbs (where, according to the regression results, they were highly unlikely to be reassigned to worse schools). Thus, the white urban students are not as advantaged as white students are generally perceived to be. Instead, these reassigned urban white students could have low political and social capital to lobby for advantaging reassignments, or at least to prevent adverse reassignments. Unfortunately, I cannot test this hypothesis directly, for I know of no population datasets that can be linked to these longitudinal student records that contain parents' political capital. Instead, I plot the academic performance of reassigned white students in urban, suburban, and rural areas. Figure 15 demonstrates that suburban white students have lower performance than reassigned urban and rural whites. Therefore, it seems unlikely that these urban whites do not have sufficient political voice to lobby for their interests. Either way, the models include initial student achievement varies by geography and reassignment, confirming the need to include student achievement as a regression control.

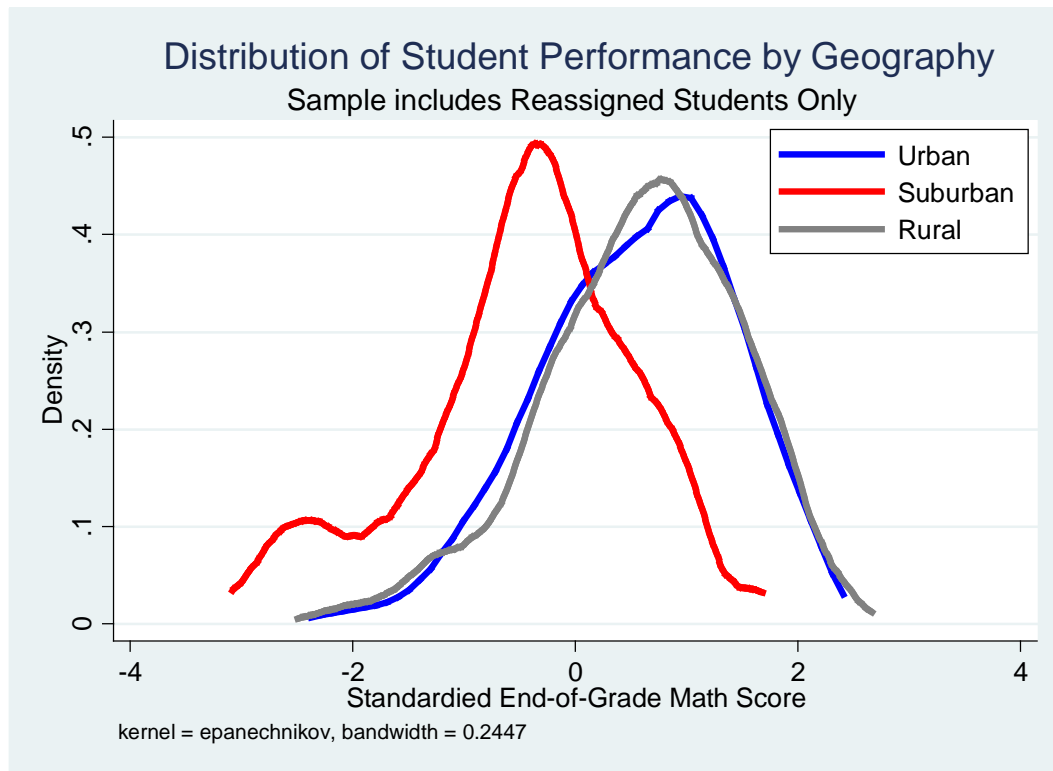


Figure 15: Individual Student Test Score Distribution among White Students, by Geography of Assigned Schools

Third and finally, it might be the case that the white families who are reassigned are not concerned by the policy change because they intend to opt for a school of choice or residential change before the next school year. Possibly, these high achieving students, despite being reassigned to lower quality schools, are more likely to opt out of those adverse reassignments. Since urban students have numerous school options available to them and many take them (Chapter 1), the next chapter will investigate whether they might also be more likely to opt out of their reassignments. This third hypothesis will be tested in the following chapter in the investigations of behavioral responses to reassignment.

Next, we turn to Figure 16, which presents the predicted probabilities from the following interactive **geography-by-FRL** model:

$$\text{Log}\left[\frac{RtWS}{1-(RtWS)}\right] = \beta_0 + \beta_1 * \text{StudentCharacteristics} + \beta_2 * \text{InitialSchoolCharacteristics} + \beta_3 * \text{Geog} + \beta_4 * \text{FRL} + \beta_5 * \text{Geog} * \text{FRL} + \beta_6 * \text{DistrictGrowth} + \gamma_{\text{District}} + \lambda_{\text{Grade}} + \text{error},$$

where RtWS means "Reassigned to Worse School."

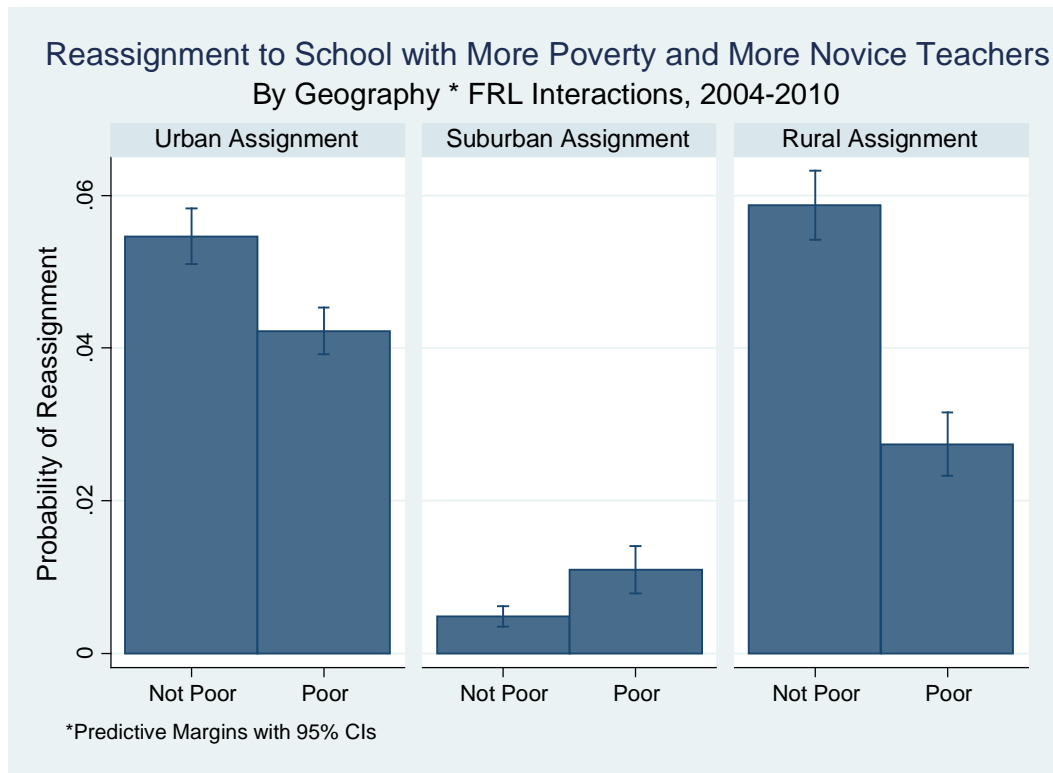


Figure 16: Weighted Predicted Probability of Reassignment to Worse School, by Geography * FRL Interactions, 2004-2010

In both urban and rural settings, non-poor students were more likely to be reassigned to schools of worse quality. The opposite was true in suburban schools: poor students were more likely than non-poor students to be reassigned to a worse school. In order, non-poor urban and rural students had the greatest likelihood of a bad reassignment,

followed by poor urban students, poor rural students, poor suburban students, and finally non-poor suburban students.

This figure, along with the former geography-by-race results, provides confirmatory evidence that suburban, non-poor families have the greatest capacity to preserve better educational opportunities for their children. These families paid a premium for housing, are largely compliant with their school assignments (see Chapter 1), and do not experience adverse reassignments. Unlike in the urban case, in which white and high academically performing students experience adverse reassignments, non-poor suburban students are largely spared from reassignments, and especially from lower quality reassignments.

2.6 Conclusion and Discussion

This chapter demonstrates that changes in districts' school assignment policies are differentially likely to affect observably different groups of students. The results establish which students are most likely to experience reassignments, as well as disadvantaging reassignments. The findings can be used to make inferences about parents' access to and involvement in school district political processes that affect student assignments.

The underlying research question in this chapter addressed the extent to which observably different students were equally likely to be reassigned. While school districts must at times enact reassignment policies, reassignments vary in their quality, defined as the change in school quality between students' existing assignments and their newly-assigned schools due to reassignment. This chapter also addressed

whether observably different students were equally likely to experience clearly adverse reassignments. To the best of the author's knowledge, these analyses provide the first insight into the prevalence of student reassignment policies.

Reassignment rates in this sample are clearly non-negligible and appear worth the effort to explore in greater detail. General reassignment patterns produced the greatest differences by geography: rural and urban students were most likely to be reassigned. Reassignment rates were also quite varied across the school districts in the sample. In addition, several subgroup patterns emerged from the analyses. For example, poor students in suburban areas were far more likely than non-poor suburban students to be reassigned. In fact, the group that was least likely to be reassigned across geography and SES was the non-poor suburban students. This finding validates the key inference that suburban non-poor families have a greater capacity than the suburban poor families to maintain consistent, and desirable educational opportunities for their children.

Often, suburban housing values are high and the schools desirable. The suburban case is one in which families might be most likely to believe that purchasing a home is akin to choosing a permanent school assignment. Potentially, the suburban poor students were more susceptible to reassignment because the wealthier families in the suburbs tend to have much more financial, social, and political capital than poorer families. Therefore, wealthier families could likely organize and engage in the political process to maintain assignments to their initial and preferred schools. This hypothesis

about political involvedness and mechanisms of action among suburban families cannot be answered here using available secondary data sources. This line of inquiry would require data beyond student information that would likely involve primary data collection to gauge parents' involvement in school board policy discussions.

In urban areas, non-poor students were only marginally more likely to be reassigned than poor students. However, among reassigned students, urban non-poor students were far more likely to be reassigned to a worse school than the urban poor students. In rural settings, too, non-poor students were more likely than poor students to be reassigned and reassigned to a worse school. Findings from Chapter 1 in this dissertation demonstrated high rates of noncompliance with school assignments among urban and rural non-poor students. Since this sample is limited to the students who comply with their assignments in the year prior to reassignment plans, it might be the case that the families who were most displeased with the assigned schools had already made a school choice decision that removed them from this sample.

If we are to consider potentially remediating public policies, then it will be necessary to understand the process by which these policy choices are made. The existing literature shows that disadvantaged families are generally less informed about and connected to the political process. Future investigations should focus on the underlying mechanisms of these processes. While this chapter is quantitative, and focuses on annual cross-section data, such a future study might be more qualitative, following a single district considering enacting a redistricting policy. It would evaluate the

influences and processes leading to the final boundaries and could follow the different iterations of proposed reassignment plans.

The following chapter in this dissertation addresses the behavioral responses of families to reassignment. Those findings will help to extend the results from this chapter in greater detail. For example, it might be the case that reassigned non-poor students do not comply with those worse assignments or it could be the case that choice policies and the transient nature of disadvantaged students leads them to comply less with reassignments. These different options produce very different policy implications for the reassignment patterns presented in this chapter.

Chapter 3: Behavioral responses to reassignment

3.1 Introduction

The former two chapters of this dissertation characterize which students are most likely to comply with schools assignments at baseline and which students are most likely to be reassigned when school districts alter school attendance zones. This chapter investigates whether families who complied with their initial school assignments still comply with school assignments following student reassignment policies. It identifies overall compliance with reassignments and then breaks down non-adherence to the policies by student subgroup and reassignment quality. Analyses identify specific types of noncompliance, including opting for an explicit school of choice, attending a non-assigned public school, leaving the public school system, and moving residences. Identifying families' compliance with reassignments allows inferences to be made about parents' satisfaction with reassignments. Often, school districts have no choice but to enact these policies; however, their design can influence parents' satisfaction with the polies. Most importantly, parents seek to avoid disruption in their education of their children; therefore, I identify the extent to which observably different families take actions to avoid these disruptive school moves that results from reassignment policies. Overall, reassignment catalyzes families not to comply with their new assignments. Given that many noncompliant families send their child to the original school bolsters the hypothesis that families principally seek to avoid disruptions in their students' educational experiences.

The research principally extends the body of knowledge on default behaviors.

Reassignment policies change the default school of a student. The new default school is the students' school of record, unless her family takes proactive steps to send her to an alternate school, or to move residences to change the school assignment. Policies can be designed as having either opt-in or opt-out defaults. Evidence from behavioral economics and medical studies indicates that individuals are most likely to follow the default option (eg. Johnson and Goldstein 2003; Thaler and Bernatzi 2004; Gale, Iwry, Orszag 2005; Johnson and Goldstein 2003; Madrian and Shea 2001). The typical default option is for students to remain at their nearby, traditional neighborhood public school unless families make an explicit choice to send their children to a different school of choice such as a charter, magnet school, or year-round school (see chapter 1 for a detailed discussion of these school types). In the case of policies that reassign students, a reassigned student's default situation is to change schools to a different school from her prior year's assignment. Since reassignment plans alter students' default school, parents and students must "choose to choose" should they want to avoid switching schools.

Some parents of reassigned students may view different default options an opportunity to attend a school of choice, since a change in schools is already forthcoming. Given that a school move seems inevitable, these reassigned families might elect to review the various school options opt for a school of choice. Alternatively, the policy might not alter families' propensity to attend their newly assigned

default school. These families are most likely to comply with all defaults, including assignment and reassignment policies. People commonly defer making choices both when none of the available options is ideal and when they cannot ascertain easily sure which option is best (Dhar 1997). Therefore, some families might comply with reassignments because they have challenges learning about and selecting an alternate school option. This chapter seeks to identify the likelihoods of these different choices, including subdivision by quality of assignment and student subgroup (race, socioeconomic status, and urban, suburban, or rural school location). Some families will move residences as a consequence of school reassignment; models also investigate these residential decisions. The observed noncompliance among different students and reassignment subtypes allows inferences to be made about parents' satisfaction with school reassignment policies. As school district policies should provide more benefits than harms to the families within their borders, observed parent behaviors can help identify whether families are indeed happier with the reassignment policy than in its absence.

3.2 Conceptual Framework

This chapter addresses (a) whether, and (b) how families do not comply with reassignment policies. Both questions include related sub-questions about compliance by student characteristic and by the quality of reassignments. Figure 17 below demonstrates how observed compliance and noncompliance can also be used to make inferences about parents' satisfaction with the reassignment policies. Results from models in

this chapter allow inferences to be made about parents' satisfaction with reassignments by identifying which families do and do not comply with the policies.

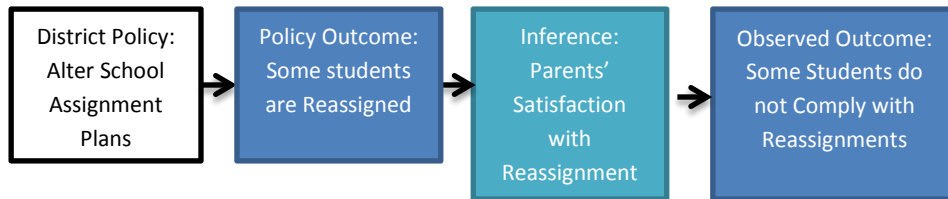


Figure 17: Model of How to Make Inferences about Parents' Level of Satisfaction with Reassignments given their Compliance Behavior

Some families who are reassigned comply with their reassignments. Three plausible explanations may account for this compliant behavior. Either (a) families are generally pleased with the schools to which their children have been reassigned are therefore content to send their children to the newly assigned schools. Alternatively, (b) families might prefer to change schools but lack the political or social capital to make the change. Finally, (c) some families might have a tendency to accept any default plan, including new assignments due to reassignment policies, with or without fully evaluating all of the school choice options.

Other families who are who are reassigned opt for a school other than their new assignments. Three plausible explanations are most likely to describe this compliant behavior. Either (a) families are displeased with the reassignments and therefore opt out of them. These families could be dissatisfied with the disruptive nature of the move, or they might dislike the characteristics of the newly assigned school. Alternatively, (b) noncompliant families might tend to move residences

more frequently than non-reassigned families, producing a spurious correlation between reassignment and noncompliance. Finally, (c) the policies might stimulate some families to consider additional school choice options given that their students would have to switch schools with or without an explicit choice on their part.

As Chapter 1 demonstrated, many families do not comply with their school assignments. Therefore, it is reasonable to expect some of both reassigned and non-reassigned students not to comply with their school assignments. If rates of noncompliance are higher among reassigned families than non-reassigned families, it can be inferred that parents do not like to be reassigned. Since some portion of both compliant and non-compliant families are likely follow their default options, regardless of whether or not they are reassigned, the increase in noncompliance among reassigned families can be interpreted as a minimum level of dissatisfaction with the new assignments. Either these reassigned families do not like their new assignment relative to the original school, or they do not like the new assignment relative to the new additional school choices they consider as a consequence of the policy.

3.3 The Consequences of Student Mobility

The negative associations between student movement and educational outcomes are well-documented. "Student mobility" can describe a school change, a residential change, or both. Reassignment policies, if families adhere to them, should increase student mobility. Movement is largely associated with poor academic performance (eg.

Engel 2006; Schwartz, Stiefel, and Chalfico 2007; Rumberger and Larson 1998; Rumberger 2003) and low school engagement (eg. Gruman et al. 2008). Widespread evidence suggests movement within a district rather than between districts is harmful for students (Hanushek et al. 2004; Ingersoll et al. 1989; Rumberger 2003; Xu et al. 2009). Within-district moves are considered more harmful to students because these moves are "reactive," or in response to life disruptions, rather than mobility expressly intended to improve opportunities. However, student moves are often bundled with other life disruptions, including parental divorce, job loss/change, or disciplinary problems (eg. Ligon and Paredes 1992). Therefore, some scholars claim most of the negative effect of moving is due to the differences between movers and nonmovers themselves, and not the moves (Downey and Pribesh 1999).

Existing literature, however, applies principally to reactive assignments where the change in school occurs secondarily to a primary life-altering event. It is not clear whether the consequences of mobility instigated by the school district, as opposed to the family, will tend to be proactive or reactive. In some cases, reassignment can be analogous to increasing school choice, implying that the consequences could be more consistent with traditionally proactive moves. For example, a move might be positive if the student transfers to a higher performing school or one that is a better match (see, for instance, Hanushek, Kain, and Rivkin 2004; Cullen, Jacob, and Levitt 2005; Holme and Richards 2009). However, as Chapter 2 demonstrated, non-poor suburban families in this sample avoided reassignments. Therefore, it is plausible that the mobility derived from these

reassignment policies can be assumed to be an additional form of reactive student mobility.

3.4 Description of Data

This chapter uses the same sample and dataset that were used in the former chapter (see Figure 2 and Table 1). The sample includes the third and fourth grade students, their schools, and their parents in a subset of growing North Carolina school districts from 2003/04 to 2010/11 who complied with their initial school assignments. This restriction helps demonstrate the impacts of the policy on the set of students who are most likely to be affected by school districts' school reassignment policies. In this chapter, I continue to use the sampling weights that were described in Chapters 1 and 2¹.

Chapter 2 of this dissertation modeled the associations between student characteristics and the quality of their reassignment. This chapter identifies the school each student actually attends in the school year following reassignment policies. For example, students in 2008/09 who experience a reassignment for the 2009/10 school year were flagged as "reassigned" in the former chapter. This chapter identifies where students attend school in the 2009/10 school year using administrative data. In so doing, it is possible to identify whether each student attends her assigned school (complier) or attends a non-assigned school (non-complier).

¹ The weights are constructed as the inverse likelihood a student has address data and assignment data in consecutive years, and are identical to the weights used in Chapters 1 and 2.

Table 16 presents the compliance and noncompliance rates for the sample of both reassigned and non-reassigned students in this chapter. Several distinct pattern differences emerge, most notably that the non-reassigned subgroup is far more likely to comply with assignments (75%) than the reassigned group (47%). Of the non-compliers, the majority attend some type of identifiable school of choice: 32 students attended a nonassigned magnet, 151 attended a nonassigned year-round school, 7 attended a charter school, and 564 attended their originally assigned school despite having been reassigned. Thus, the largest share of students continued to attend their original school assignments.

Relatively similar proportions of reassigned and non-reassigned students attend a non-assigned traditional public school (12% and 10%, respectively) and attrit from the sample (8% and 6%, respectively). These similar proportions could indicate the transient nature of a subset of the public school student body. The values might also serve as a reasonable minimum threshold of noncompliance to expect regardless of any change to school assignments.

Table 16: Next Year's Behaviors among Initial Compliers, Number and percentage of subgroup

Next Year's Behavioral Responses	Not Reassigned Subgroup (n=60,922)	Reassigned Subgroup (n=2,159)
Comply	45,813 (75%)	1,009 (47%)
Non-Assigned Traditional Public School	6,004 (10%)	262 (12%)
Non-Assigned Magnet, Charter, Year-Round, or Original Assignment	4,476 (7%)	754 (35%)
Attrit from Public Schools	4,629 (8%)	134 (6%)

3.5 What types of Families Do not Comply: Methods and Results

The first research question in this chapter asks: "What types of families do not comply with reassignment policies?" Several logistic regressions that predict students' noncompliance with their school assignments will help to answer this research question. Each logistic regression is weighted by the inverse likelihood students are in the sample. These are the same weights used in both chapters 1 and 2 and allow inferences to be made about all students in the sample districts. The dependent variable in the models is a binary indicator for whether a student complies with her new assignment for the following year and is a function of a vector of student characteristics, a vector of initial school characteristics, the lagged 5-year total student population growth in the district, and fixed effects for the district, grade, and year. The independent variable of primary interest is the indicator for whether a student is reassigned. In addition, to determine whether patterns differ by student subgroup, additional demographic variables and interactive models will help facilitate that investigation. The most general model takes the following form, where the key covariate is an indicator for whether a student is reassigned:

$$\text{Log}\left[\frac{\text{DnC}}{1-(\text{DnC})}\right] = \beta_0 + \beta_1 * \text{StudentReassigned} [0, 1] + \beta_2 * \text{StudentCharacteristics} + \beta_3 * \text{InitialSchoolCharacteristics} + \beta_4 * \text{DistrictGrowth} + \gamma_{\text{District}} + \lambda_{\text{Grade}} + \text{error},$$

where "DnC" means Does not Comply with next year's assignment.

Individual-level covariates include student race (White is the reference group and other race options are Black, Latino, Asian, Multi/Other), FRL (the reference group is not poor), the geography of

the school to which a student was assigned (City is the reference groups, and the other geography options are suburb and rural), a students' standardized math test score, indicators for being Limited English Proficient, female, and old for grade (defined as having a birthdate after the cutoff for students in that grade and year). As observably different students might respond to changing school defaults differently, these covariates are important to include in the models. The regression output for this basic, non-interactive model is presented in Appendix C.

The figures that follow present predicted probabilities for select covariates. The first figure demonstrates the different rates of noncompliance across the sample school districts. Noncompliance with next year's assignments varies across districts in the sample from about 6 percent in Union County to 17 percent in Durham County. The sample excludes students in promotional grades of school, so none of this noncompliance is structural. Given that the sample excludes students who did not attend their assigned school in the prior year, these rates reflect "new" non-compliers in each school district.

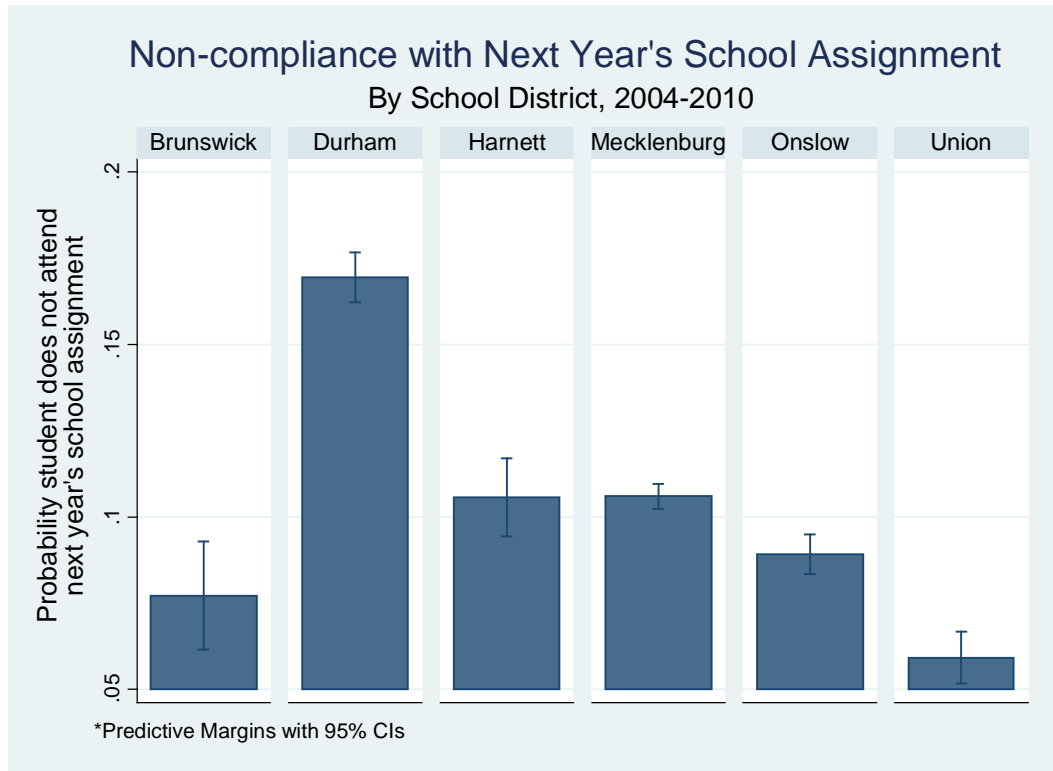


Figure 18: Weighted Predicted Probability of Noncompliance with Next Year's School Assignment, by District, 2004-2010

To determine the association between theoretically-relevant independent variables and whether a student "Does not Comply," I ran the following model:

$$\text{Log}\left[\frac{DnC}{1-(DnC)}\right] = \beta_0 + \beta_1 * \text{StudentReassigned} [0, 1] + \beta_2 * \text{Geography} + \beta_3 * \text{Race} + \beta_4 * \text{Poor} + \beta_5 * \text{StudentCharacteristics} + \beta_6 * \text{InitialSchoolCharacteristics} + \beta_7 * \text{DistrictGrowth} + \gamma_{\text{District}} + \lambda_{\text{Grade}} + \text{error}.$$

Most notable is the large difference in compliance among students who either are or are not reassigned between years. Whereas 10 percent of initial compliers who were not reassigned do not attend their assigned school the following year, 40 percent of reassigned students

do not attend their assigned school. Graphs of the predicted probabilities of select covariates can be found in Appendix C.

In the former two chapters, geography produced highly different patterns in the association between students' likelihood to be reassigned and to be reassigned to schools of lower quality. Given these large differences by geography, I choose to estimate an interactive model to determine whether behavioral differences occur by subgroups in the different geographic contexts. The weighted logistic regression predicts whether a student "Does not Comply" with her school assignment according to interactions between students' eligibility for free/reduced price lunch and school geography in the following form:

$$\text{Log}\left[\frac{DnC}{1-(DnC)}\right] = \beta_0 + \beta_1 * \textit{StudentReassigned} [0,1] + \beta_2 * \textit{Poor} + \beta_3 * \textit{Geography} + \beta_4 * \textit{StudentReassigned} * \textit{Poor} + \beta_5 * \textit{StudentReassigned} * \textit{Geography} + \beta_6 * \textit{Poor} * \textit{Geography} + \beta_7 * \textit{StudentReassigned} * \textit{Poor} * \textit{Geography} + \beta_8 * \textit{StudentCharacteristics} + \beta_9 * \textit{DistrictGrowth} + \gamma_{\textit{District}} + \lambda_{\textit{Grade}} + \textit{error}.$$

Select predicted probabilities for this model are provided in Figure 19. These results demonstrate consistently higher noncompliance among the reassigned subgroup of students in each geographic locale². Even among non-reassigned students, poor students are about twice as likely as non-poor students not to comply. Rural non-poor students are the least likely among reassigned subgroups not to comply (22%) immediately following school reassignment. Students in this most compliant reassigned subgroup are statistically more likely not to

² Consistent with the former two chapters, recall that geography is derived from the National Center for Education Statistics and the United States Census and refers to the school location. All students assigned to a given school are described as having that school's urban/suburban/rural geographic designation.

comply than all non-reassigned students, other than urban poor, with whom no statistically significant difference emerges. Urban and rural poor students are more likely not to comply than suburban poor students. The largest subgroup difference in noncompliance for a given geographic type and reassignment status occurs between reassigned rural non-poor and poor students: poor rural students who are reassigned did not comply with the new assignments about 60 percent of the time versus about 22 percent of non-poor reassigned rural students.

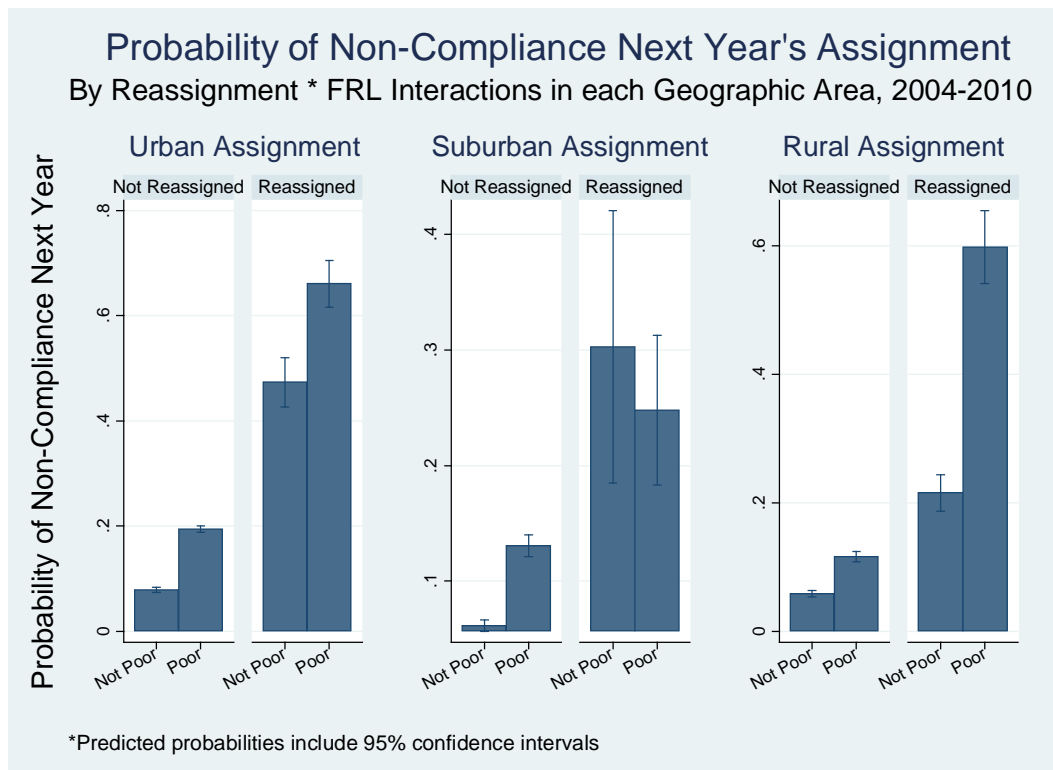


Figure 19: Weighted Predicted Probability of Noncompliance with next Year's Assignment, by Geography, FRL, and Reassignment, 2004-2010

Suburban reassigned students do not have a different statistical likelihood of noncompliance according to their socioeconomic status. As the former chapter demonstrated, suburban students -- especially

non-poor suburban students -- were the least likely group of students to be reassigned. They also had a very low likelihood of being reassigned to a school with more student poverty and more novice teachers. Therefore, this subgroup has a very small sample size, which makes group differences difficult to establish. Still, suburban non-poor students have a larger point estimate (30%) than poor suburban students (25%). This is the only group for which there is not a clearly larger likelihood for noncompliance among the poorer students, again bolstering the hypothesis about suburban non-poor families having the greatest capacity to construct and maintain the most desirable outcomes for their children.

Since these students all complied with their school assignments in the year prior to the reassignment policies, the noncompliance predicted probabilities for non-reassigned students helps demonstrate a reasonable minimum estimate for noncompliance that can be expected in the sample school districts. Specifically, non-poor students appear to have a baseline rate of noncompliance around 5-10% and poor students between 10-20%. These predicted baseline rates of noncompliance are far lower than noncompliance estimates in Chapter 1, especially for urban students. In addition, Chapter 1 demonstrated that non-poor students in both the suburbs and in rural schools were more likely not to comply than their poor classmates. Among the initial compliers, then, the higher rate of noncompliance among poor students can be the result of several causes. Poorer students might be least pleased with the changes, might be most likely to exercise some new school choice option, or they might be more transient than non-poor students. Given

that non-poor suburban and rural students had higher baseline rates of noncompliance, the non-poor families that were discontent with the assignments had likely already acted. Thus, the elevated rate of noncompliance for poor rural students is likely a signal that reassignment policies catalyzed new choices by families to opt out of school assignments.

The implications of the former model are twofold. First, and most important, reassignment increases noncompliance among reassigned families. Thus, families who previously complied with their school assignments are no longer content with their (new) default school. Second, clear socioeconomic patterns emerge. Poor students in urban and rural schools are more likely than their non-poor classmates not to comply; however, reassigned poor and non-poor suburban students do not have different rates of noncompliance³. The least likely reassigned group of students not to comply is the non-poor rural students. These patterns hint at different capacities of families by geographic and financial characteristic to engage in school choice when districts reassign students. The non-poor rural families in this sample reside in school districts that also contain suburban and urban families who take up school choice options. Therefore, the low rate of noncompliance among the rural non-poor families appears to signal that

³ I also ran interactive models by geography-and-race. The findings indicate that reassignment produces an approximate doubling in the likelihood of noncompliance across the different race-by-geography groupings. In each geographic type, reassigned white students are more likely than non-reassigned black students to not to comply with the new assignment. In other words, reassignment status trumps race as a predictor of compliance. This finding implies that changing the default option promotes new choices, rather than families continuing to send their child to the new default school.

they have less access to the school choice options relative to their urban and suburban peers.

As was done in Chapter 1, I calculate dissimilarity indices that compare segregation by race and FRL eligibility by comparing the actual segregation with the hypothetical segregation had all students attended their school assignments. These values are reported in Figure 17. The results indicate that when students opt out of their school assignments, segregation increases. These findings are consistent for both race and FRL as well as across all geographic contexts. The implication is that the choices families make not to comply with their reassignments increase segregation.

Table 17: Dissimilarity indices by Race and FRL Status, by geography

Type of School Assignment	White-Nonwhite Comparison		FRL-non-FRL Comparison	
	Assignments	Actual School	Assignments	Actual School
Urban	.42	.49	.32	.36
Suburban	.39	.41	.30	.32
Rural	.49	.53	.26	.31

Given that the geographic associations are less substantial in magnitude than in prior chapters, the following models will control for, but not independently report, geographic differences. Instead, I shift the emphasis to the different reassignment subtypes by quality defined in Chapter 2⁴. Again, models compare the quality of students'

⁴ This indicator was constructed based on the characteristics of students' assigned school in the current year relative to the current year's characteristics of her next year's assignment. Reassignment subtypes are

school assignments by comparing the percentage of students eligible for free or reduced price lunch and the percentage of teachers with 0-3 years of experience at their initial assigned school with their newly assigned school due to reassignment. The following models are logistic regressions, and the independent variable of interest is the quality of the students' reassignment. This model predicts whether a student "Does not Comply" and is of the following form:

$$\text{Log}\left[\frac{DnC}{1-(DnC)}\right] = \beta_0 + \beta_1 * \textit{Reassigned} [\textit{Better}, \textit{Worse}, \textit{Other}, \textit{None}] + \beta_2 * \textit{StudentCharacteristics} + \beta_3 * \textit{InitialSchoolCharacteristics} + \beta_4 * \textit{DistrictGrowth} + \gamma_{\textit{District}} + \lambda_{\textit{Grade}} + \textit{error}.$$

Results in Figure 20 demonstrate that all reassigned students are far more like than non-reassigned students not to comply, regardless of the quality of the reassigned school. These findings yet again imply that reassignment is the driver of noncompliance. It seems that the negative shock of student mobility drives parents' choices not to comply with the new school assignment, regardless of the quality of that new school.

defined as "worse" if they are to schools with more novice teachers and more poor students relative to students' original schools, "better" if they are to schools with fewer novice teachers and poor students relative to students' original schools. When the direction of change in student poverty rate and percentage of novice teachers is mixed, the reassignment is considered neither better, nor worse, and is classified as "other." Table 14 provides frequencies of these reassignment subtypes.

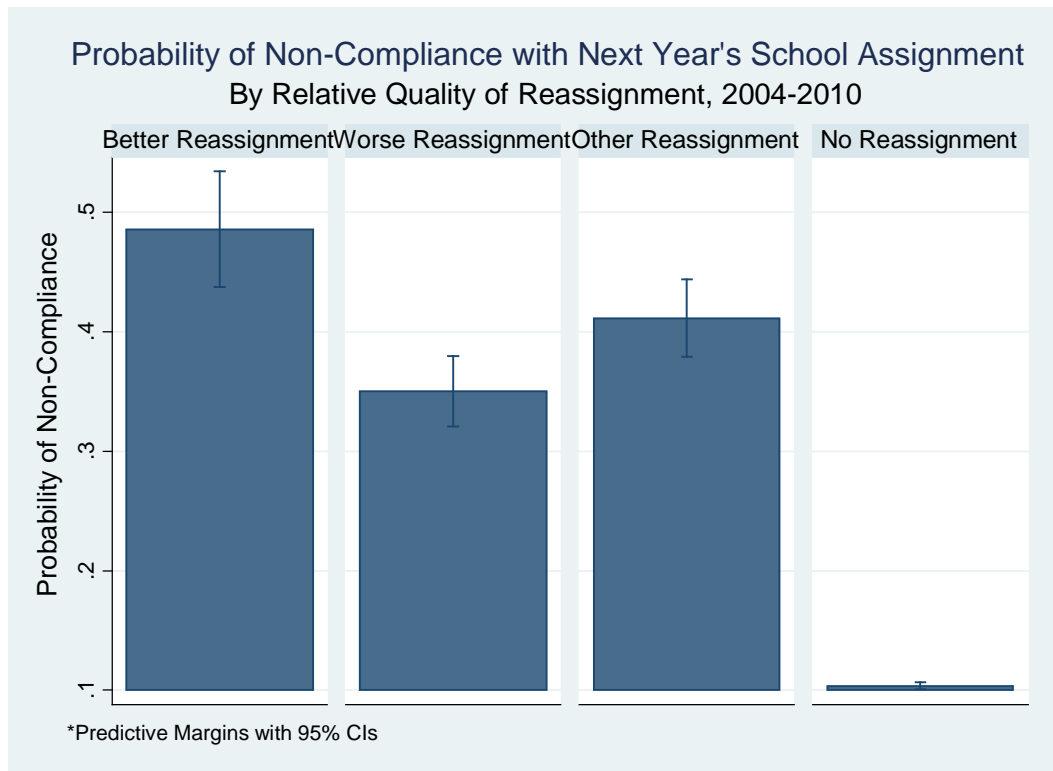


Figure 20: Probability of Noncompliance, by Reassignment Quality

3.6 How do Families Respond: Methods and Results

The previous section of this chapter established the large and statistically significant association between student reassignment and noncompliance with school assignments. This section now turns to some of the ways in which families do not comply with reassignments. Remaining analyses address the research question, "How do families respond to reassignment policies?" First, I use a non-interactive, weighted, multinomial logistic regression determines the different behavioral responses for reassigned and non-reassigned families. The frequencies of the behaviors are provided in Table 16. Responses

include complying with next year's assignment, attending a non-assigned traditional public school, attending a non-assigned school that uses a known choice mechanism (magnet, charter, year-round, and being grandfathered into original school), and whether the student attrits from the sample. To identify these different behavioral responses, the multinomial logistic regression is of the following general form. Main effects of select covariates are presented in Appendix C and the behavioral outcomes by reassignment status are presented in Figure 21:

$$\text{Log}\left[\frac{\text{Student Attends Non-Assigned Charter, Magnet, or Year Round School}}{(\text{Student Attends Assigned School})}\right] = \beta_0 + \beta_1 * \text{StudentIsReassigned} [0, 1] + \beta_2 * \text{StudentCharacteristics} + \beta_3 * \text{InitialSchoolCharacteristics} + \beta_4 * \text{DistrictGrowth} + \gamma_{\text{District}} + \lambda_{\text{Grade}} + \text{error},$$

$$\text{Log}\left[\frac{\text{Student Attends Non-Assigned Traditional Public School}}{(\text{Student Attends Assigned School})}\right] = \beta_0 + \beta_1 * \text{StudentIsReassigned} [0, 1] + \beta_2 * \text{StudentCharacteristics} + \beta_3 * \text{InitialSchoolCharacteristics} + \beta_4 * \text{DistrictGrowth} + \gamma_{\text{District}} + \lambda_{\text{Grade}} + \text{error},$$

$$\text{Log}\left[\frac{\text{Student Attrits from Sample}}{(\text{Student Attends Assigned School})}\right] = \beta_0 + \beta_1 * \text{StudentIsReassigned} [0, 1] + \beta_2 * \text{StudentCharacteristics} + \beta_3 * \text{InitialSchoolCharacteristics} + \beta_4 * \text{DistrictGrowth} + \gamma_{\text{District}} + \lambda_{\text{Grade}} + \text{error}.$$

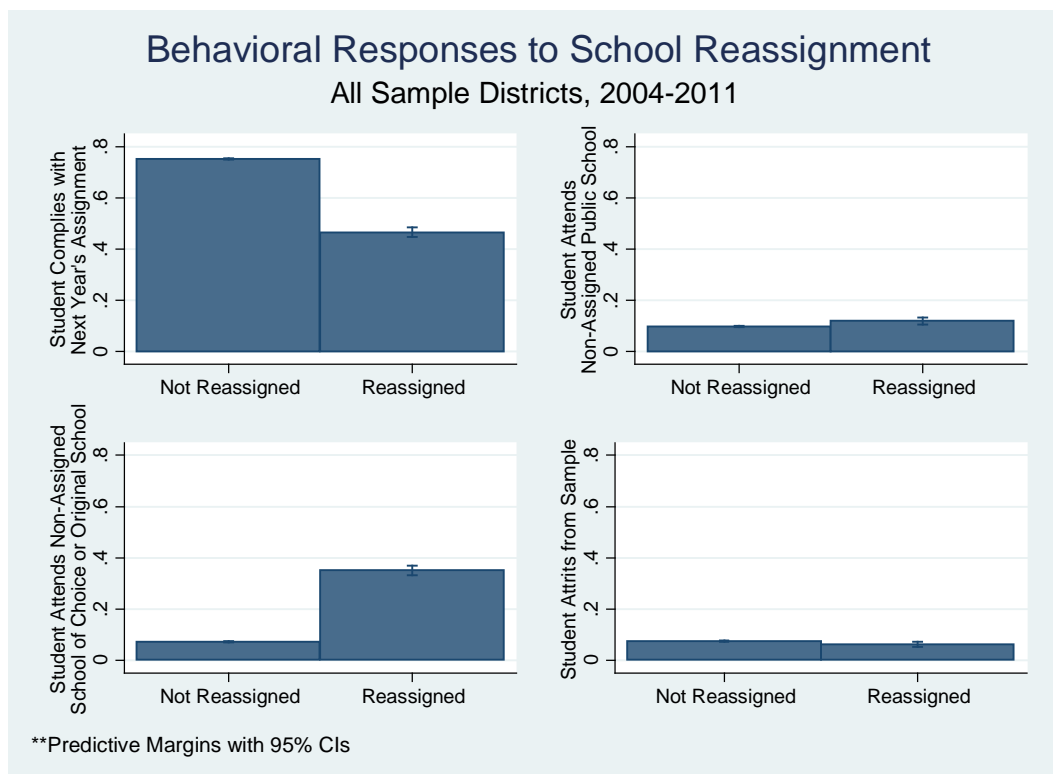


Figure 21: Weighted Predicted Probability of Noncompliance Types, by Reassignment, All locales together, 2004-2011

Reassigned students are more likely than non-reassigned students not to comply by attending either a school of choice or a non-assigned traditional public school. There is no association between reassignment and attrition from the sample. Both reassigned students and non-reassigned students have about a 15-16% likelihood of noncompliance to a non-assigned traditional public school. Of note, these predicted values are about the same as the noncompliance predictions in Chapter 1.

Reassigned students have about a 40% predicted probability of attending a non-assigned school of choice. Within this overarching noncompliance category is attending the same school despite being

reassigned. The following figure compares the individual math performance of reassigned third and fourth graders of this "grandfathered" group of students to their reassigned peers who complied with the reassignments. The curves demonstrate that the third graders who remain enrolled in their original schools often have lower math performance than the compliers. Since reassigned families commonly stay in their original schools, it can be inferred that parents appear concerned, first and foremost, with avoiding having their children change schools. Subsequent subgroup analyses will address whether these overall patterns differ by observable student characteristic.

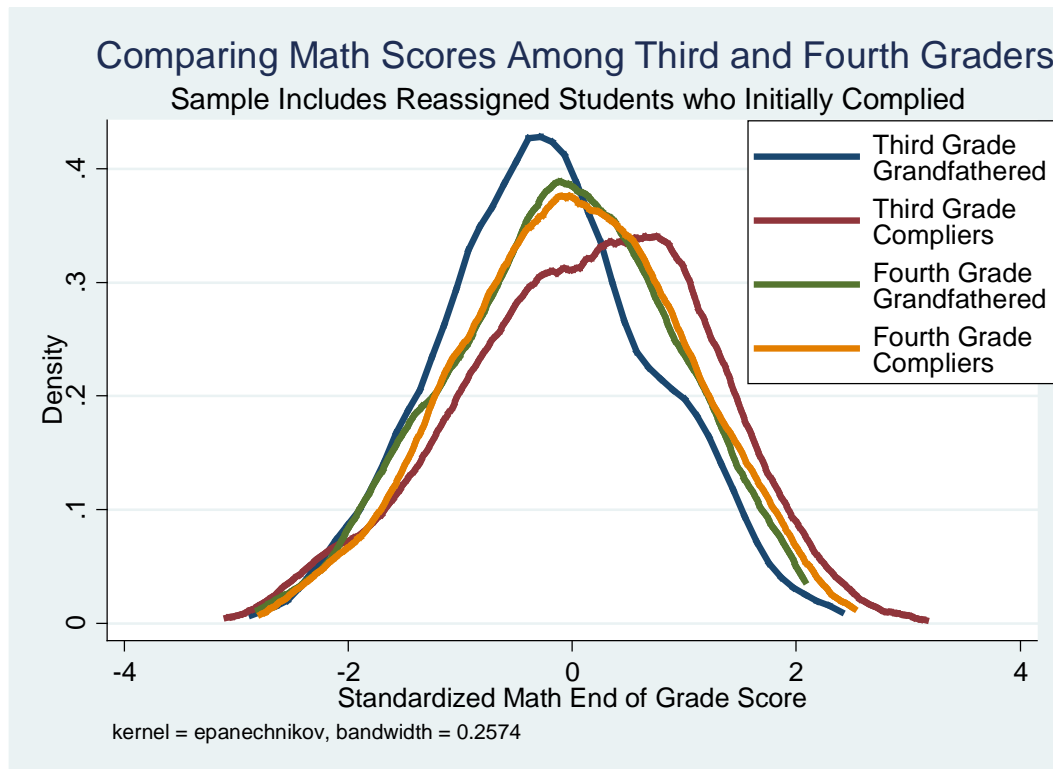


Figure 22: Distribution of Standardized Math Test Score Performance among Reassigned Initial Compliers who Attend Schools where Some Students Remain at the School Despite Being Reassigned

By using a weighted multinomial logistic regression, I seek to evaluate whether noncompliance differs by the quality of the reassigned school relative to the original school. The independent variable of interest is the "quality of reassignment" variable, which again is defined according to the percentage of FRL students and novice teachers at students' original school and their next year's assignments. This multinomial logistic regression is of the following form:

$$\text{Log}\left[\frac{\text{Student Attends Non-Assigned Charter, Magnet, or Year Round School}}{(\text{Student Attends Assigned School})}\right] = \beta_0 + \beta_1 * \text{StudentIsReassigned} [0, 1] + \beta_2 * \text{QltyOfNextYear'sAssignment} + \beta_3 * \text{InitialSchoolCharacteristics} + \beta_4 * \text{StudentCharacteristics} + \beta_5 * \text{DistrictGrowth} + \gamma_{\text{District}} + \lambda_{\text{Grade}} + \text{error},$$

$$\text{Log}\left[\frac{\text{Student Attends Non-Assigned Traditional Public School}}{(\text{Student Attends Assigned School})}\right] = \beta_0 + \beta_1 * \text{StudentIsReassigned} [0, 1] + \beta_2 * \text{QltyOfNextYear'sAssignment} + \beta_3 * \text{InitialSchoolCharacteristics} + \beta_4 * \text{StudentCharacteristics} + \beta_5 * \text{DistrictGrowth} + \gamma_{\text{District}} + \lambda_{\text{Grade}} + \text{error},$$

$$\text{Log}\left[\frac{\text{Student Attrits from Sample}}{(\text{Student Attends Assigned School})}\right] = \beta_0 + \beta_1 * \text{StudentIsReassigned} [0, 1] + \beta_2 * \text{QltyOfNextYear'sAssignment} + \beta_3 * \text{InitialSchoolCharacteristics} + \beta_4 * \text{StudentCharacteristics} + \beta_5 * \text{DistrictGrowth} + \gamma_{\text{District}} + \lambda_{\text{Grade}} + \text{error}.$$

Of note, the model would not converge with four behavioral responses and four reassignment quality types; therefore, I combined the "better" and "other" reassignment classifications. Again, this composite score, although crude, provides a valuable indication of the worst reassignments. Since reassignments clearly catalyze noncompliance, it can be inferred from these revealed behaviors that families are not pleased with being reassigned. Therefore, this construct for worse school provides a useful reference because it

provides an estimate for the very worst reassignments while also accounting for the characteristics of students' initial schools.

Again, results indicate that disentangling the differences between reassignment quality are less of a factor than being reassigned or not. This finding is most striking for newly attending a school of choice or attending the original school. Students assigned to a different school of either worse or an indeterminate change in quality are commonly enticed to seek alternate schools, including non-assigned, non-choice public schools. Reassignment quality again is not associated with enrolling in a non-assigned traditional public school or sample attrition. Yet again, these findings support the hypothesis that when disruptions affect the stability of students' educational environments, when possible, parents will seek alternate options.

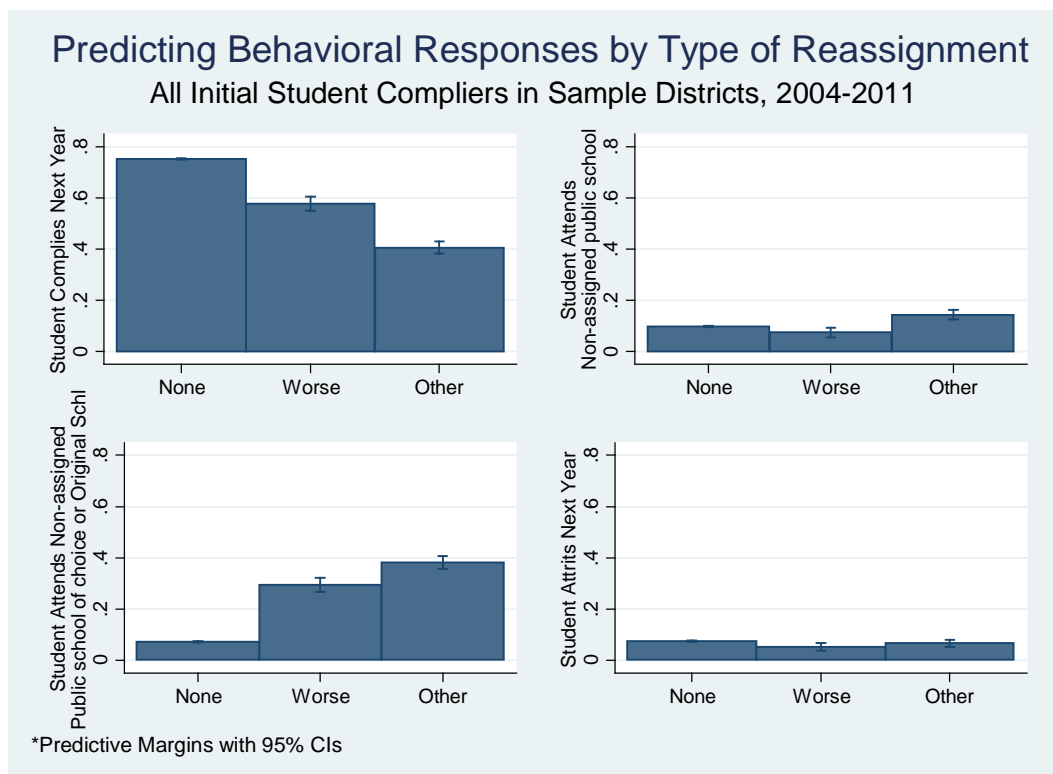


Figure 23: Weighted Predicted Probability of Noncompliance Types, by Reassignment Subtypes, All locales together, 2004-2010

Finally, I examine whether any association between reassignment and residential mobility exists. It is difficult to ascertain from this model whether reassigned students would have been as likely to move residences in the absence of this policy, or if their very likelihood to move made them more susceptible to be reassigned. Results from Chapter 1 demonstrate that many students do not attend their assigned schools and Chapter 2 provides evidence that certain families are more likely to be reassigned than others. Perhaps districts intentionally reassign the already-mobile students, for those students will experience a disruption in their schooling regardless of whether they are reassigned. Despite this possibility, I run the

following weighed logistic regression, and report the predicted probabilities for select covariates.

$$\text{Log}\left[\frac{\text{Student Moves Residence}}{1-(\text{Student Moves Residence})}\right] = \beta_0 + \beta_1 * \text{ReassignmentQuality} + \beta_2 * \text{Geography} + \beta_3 * \text{Race} + \beta_4 * \text{Poor} + \beta_5 * \text{InitialSchoolCharacteristics} + \beta_6 * \text{StudentCharacteristics} + \beta_7 * \text{DistrictGrowth} + \gamma_{\text{District}} + \lambda_{\text{Grade}} + \text{error}.$$

Figure 24 indicates that reassignment, indeed, catalyzes families to move residences. Reassignments of all quality (better, worse, and other) have a far higher association with student mobility than non-reassigned students. It also supports the findings in other literature that urban, poor, and minority student are often more mobile.

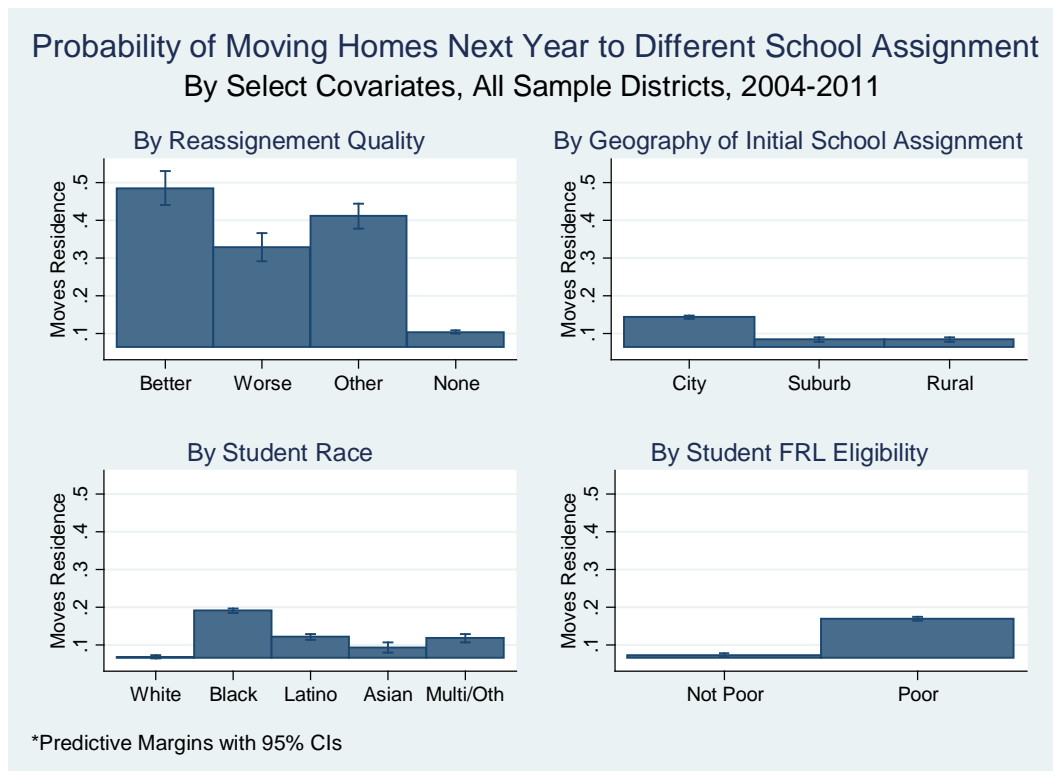


Figure 24: Weighted Predicted Probabitliiy of Moving Residences, by select covariates, All locales together, 2004-2011

3.7 Conclusion and Discussion

This chapter identified the behavioral responses of families in select North Carolina school districts with third and fourth grade student when school districts enact reassignment policies. It reported families' compliance with school reassignments, and characterized the specific behavioral responses among noncompliant families. More than any subgroup identifier (geography, race, FRL, and their interactions), being reassigned produces the largest association with noncompliance: over half of reassigned upper elementary students do not comply with their new assignments. Noncompliance occurs across the school quality spectrum, and for all racial, socioeconomic, and geographic student subgroups. Overall, the reassignment policies appear to stimulate more families to make explicit school choice decisions than they might have in the absence of such policies. These high rates of noncompliance lead to the inference that parents are largely displeased with the prospects of being reassigned. Given that the most common behavioral response to reassignment is to continue to attend the original school assignment, much of the non-compliance with assignments still leaves students in their same school. This choice to remain in the original school provides suggestive evidence that parents seek to avoid disruptions in their children's schooling. Noncompliant parents of reassigned students appear to be principally seeking to prevent student mobility.

Baseline rates of noncompliance for non-reassigned students provide insights about the minimum rates of student mobility that school districts can expect. Even among the initial compliers, over 10

percent of students do not comply with their next years' assignments. As school districts must distribute students among the schools within their borders, having this many students unlikely to attend their next years' assignments can produce difficulties in planning for staffing and other needs at schools. In addition, the choices families make to opt out of their reassignments increases both racial and socioeconomic segregation in the school districts.

Related to student mobility, findings in this chapter indicate that associations between student reassignment and students changing residences are highly correlated. All reassignment subtypes are associated with increased residential mobility. Future extensions to this research might consider investigating whether families with students in grades other than third and fourth grade also alter their decisions as a consequence reassignment policies. In addition, extensions of this study would benefit by identifying whether reassignment policies generate any academic impacts on reassigned students or their peers. Finally, whereas this chapter inferred parents' preferences by observing their actions, additional work on noncompliance with reassignment policies would benefit from interviews and other qualitative data to confirm and refine the conclusions.

Conclusions

When education policy scholars study the factors that influence students, they typically focus on student-, classroom-, teacher-, and school-level factors. These factors are not only proximal to students but also much easier to study than district policy decisions-- reliable data on school district policies and their functional consequences are scarce and difficult to access. When scholars study school district policies, they generally focus on policy choices that are simple and easy to measure such as hiring decisions, teacher salaries, school finances, curriculum, and testing. Other choices, such as decisions about where school properties will be located and the school assignments of students within a district are typically ignored.

To date, school assignment and reassignment policies have not been studied in great rigor, in part due to the difficulty in acquiring data on students' residential locations along with their school assignments. To the best of my knowledge, these data sources have never been linked across multiple school districts and years so as to enable rigorous, generalizable studies of student reassignment policies. After compiling longitudinal data on school assignments, I was fortunate to be able to merge exact student address data to create a new dataset with precise linkage of students to school assignments and reassignments. The result of my data collection efforts not only enabled the work described herein, but the technique to match longitudinal geographic data with administrative student records could also be applied to other future education policy research questions for which precise student geographic data is required.

School district student assignment and reassignment policies set the distributional patterns of students among schools within each district. Advantaged families utilize this process to further construct and maintain improved educational opportunities for their children in three core ways: they can afford to live in homes with the most desirable school assignments (Chapter 1), they influence the policy process to avoid adverse reassignments (Chapter 2), and often do not comply with school reassignments (Chapter 3).

Overall, the first chapter finds that noncompliance with school assignments ranges from 6 percent to 40 percent. Even the school district in the sample that has no explicit school choice options has 18 percent noncompliance. 45 percent of urban blacks and less than 20 percent of both suburban and rural whites attend a non-assigned school. It seems urban students have many choices available to them and often take them whereas suburban and rural families, when they do not comply, are more likely to attend a non-choice school. These findings lead to the inference that urban families are less content with their assignments, and many of these families take advantage of their school choice options. Of note, these collective noncompliance choices increase racial segregation in the districts relative to if students had all attended their assigned schools. The findings from Chapter 1 are consistent with existing literature on families' residential choices, financial freedom, advantaged actors "voting with their feet," and schools being more segregated as a result of school choice than in its absence. The work extends existing bodies of knowledge by

investigating school choices in multiple school districts and across multiple years.

In the second chapter, I find that of the initial compliers with school assignments, 2 to 16 percent of students in the sample districts are reassigned. At a minimum, this is a clearly a non-negligible potential policy impact. By student subgroup, suburban students are highly unlikely to be reassigned, especially suburban non-poor students. Rural non-poor are reassigned, and are reassigned to schools of lower quality than their original schools. Considering that these are very large districts with many schools, inferences can be drawn that suburban families are able to outcompete rural families to maintain stable educational environments for their children.

In the third chapter, I investigate noncompliance patterns following reassignment policies. Families that are reassigned are highly likely to not comply with their new assignments across geographic, racial, and socioeconomic subgroups. Noncompliance rates at least double each subgroup pattern by reassignment status and are as high as 60 percent among the reassigned rural poor. Students who do not comply are most likely to attend their original schools, implying that stability is the largest driver of noncompliance. Again, noncompliance increases school segregation by both race and socioeconomic status. Reassignment is also associated with higher rates of student mobility.

A story emerges from the dissertation about more than just the compliance behaviors and political economy of families to assignment and reassignment policies. Synthesizing the findings across the

chapters provides meaningful student subgroup patterns that are also consistent with existing literature. Emerging from the three chapters collectively is a story about three groups-- suburban students, poor urban students, and non-poor rural students.

The most advantaged parents, those who live in the suburbs and who are not poor, have the greatest capacity to generate and maintain educational resources for their children. Results from these three dissertation chapters reveal patterns consistent with the hypotheses that these families take proactive, preventative steps to produce the optimal educational opportunities for their children, yet they are also able to react to undesirable policies, when necessary. First, these families have sufficient financial capital to live in homes with desirable school assignments. Only rarely do these non-poor suburban families opt out of their school assignments. Second, these families have sufficient political capital to avoid disruptive student reassignments, and reassignments to schools with more poverty and more novice teachers. Finally, in the rare case that these families are reassigned, 30 percent opt out of the reassignments.

The students generally considered to be disadvantaged in the educational process are urban students who are poor. These students often attend low performing, highly segregated schools (Sohoni and Saporito 2009) that have less qualified teachers (Clotfelter, Ladd, Vigdor 2005; Clotfelter, Ladd, Vigdor, Wheeler 2006) and principals (Clotfelter, Ladd, Vigdor, Wheeler 2006; Loeb, Kalogrides, Horng 2010) and high rates of teacher turnover (Jacob 2007; Scafidi, Sjoquist, Stinebrickner 2007). Although these families generally do not have

sufficient resources to live in areas assigned to the highest performing schools, many of these families are able to take advantage of school choice policies. Results in the three chapters demonstrate that unlike suburban non-poor families who make proactive residential and school choice decisions, these poor urban families generally react to the policies. First, although they live in areas with undesirable school assignments, these poor, urban families have very high rates of noncompliance with their school assignments. Their decision to opt out of assignments demonstrates their dissatisfaction with their school assignments; at the same time, their behavior demonstrates that they have access to alternate options. Second, these families are nearly 4 times as likely as the non-poor suburban families to be reassigned and are 5 times as likely to be reassigned to worse schools. These high rates of reassignment demonstrate that these families might be politically marginalized in the student reassignment process. Despite their low political capital, these families are the most likely student subgroup to opt out of their new assignments following reassignment policies. This behavior, while reactive, does still enable the students to avoid disruptive school moves.

Non-poor students who attend rural schools within districts also containing urban and suburban areas demonstrate mixed advantaging and disadvantaging behaviors. Although these families have financial means, their rural schools and the surrounding areas likely have fewer resources than either the suburbs (with neighborhoods and families that politically organize) or cities (where choice options are more abundant and where policies are sometimes designed with these students

specifically in mind to improve equity). After students at urban schools, the rural non-poor students are the most likely not to comply with initial school assignments. These revealed preferences suggest that these families are not entirely content with their rural school offerings. The rural non-poor are the most likely group to be reassigned and roughly tie with the urban non-poor for likelihood of reassignment to a school of lower quality. Since these reassignment policies are enacted within very large school districts containing both rural and suburban schools, it seems the rural families are outcompeted by advantaged suburban families. Unlike suburban families, however, reassigned rural students typically comply with their reassignments. Perhaps both the high propensity to be reassigned and the low rate of noncompliance demonstrate that rural non-poor families, despite having financial resources, have little political and social capital. Of note, since the rural areas represented in this sample were contained within school districts which also contained urban and suburban areas, the results likely cannot be extended to districts that are purely rural.

The school districts in this sample are all growing in population and have a mixture of school types: three of the districts contain both suburban and rural schools and three contain suburban, urban, urban, and rural schools. North Carolina is not unique in this regard: all 50 states have school districts with both suburban and rural schools in at least one school district and 48 states (all states other than Hawaii and Vermont) have this mixture of school locales along with student

population growth from 2003/04-2010/11⁵. In the 2010-11 school year, of the 47.2 million students in United States traditional schools serving K-12 students, nearly half of the nation's students (47.5 percent) attended schools in school districts with suburban and rural schools, while nearly a quarter (23.3 percent) attended schools in districts with urban, suburban, and rural schools. 14.6 million students (31 percent of the nation's traditional public school students) attended schools in growing districts with both rural and suburban schools. Given these commonalities between the districts in this sample and others across the nation, the findings from this dissertation have the potential to be relevant for many locations outside of the sample school districts and state.

The nature of parents' responses to student assignment and reassignment policies suggests that many disadvantaged families are not as engaged in the proactive policy-making processes as are advantaged families. It is very possible that only the most advantaged among the disadvantaged have made these school choices, leaving the most highly disadvantaged students behind. Therefore, additional efforts to support disadvantaged families become more aware of their school choice options and capable of acting on those preferences might increase educational equity in the district. Additionally, many students appear to attend their non-choice, non-assigned schools. Greater transparency about these alternate ways to opt out of school assignments and

⁵ These totals were calculated by the author using public National Center for Education Statistics data on each public school in the country and its associated NCES location code, described above. The 2010-11 school year was the most current year of public access data at the time of writing.

reassignments should also increase equity in the district, because the options should become more available to non-advantaged students.

One key policy recommendation emerges from this research. Parents clearly are averse to their children being reassigned, seemingly because they seek to avoid the disruption. School districts might be able to increase the rates of compliance through two mechanisms. First, if they choose to enact reassignments, they can employ fill-as-you-go systems. Using this design, when districts open new schools, they would populate a single grade each year. For example, a new K-5 elementary school could open by only serving kindergarteners. In the following year, the school would add a first grade along with a new kindergarten cohort. In the fifth year of operation, the school would serve students in grades K-5. This fill-as-you-go system would not increase non-promotional school mobility in the district in any year. Thus, if school districts employed this populating system, the disruptive effects of reassignments could be greatly reduced. Indeed, no student would need to move schools other than the students who are already promoting to a new school level. The second policy option that minimizes disruptive moves is to accommodate population fluctuations at existing schools rather than opening new schools in growing areas or closing shrinking schools. In so doing, no students would need to change schools despite the population fluctuations.

Finally, I suggest additional scholarly work of two primary types. First, assignment and reassignment policies should continue to be studied. These policies clearly affect students' access to schools

and parents demonstrate that they make behavioral choices in light of both existing policies as well as changes to them. Extensions of this work would benefit from qualitative work to solicit actual parental feedback to complement the inferences made in these analyses. Additional quantitative work on these policies could identify the policy impacts on changes in housing values, and of course, on student achievement and other educational outcomes. Second, education policy research would benefit from additional work that links education databases with other geographic information. These chapters provide several examples of how geographic information linked to student data can extend existing bodies of literature. Many new and important policy-relevant questions can be answered if scholars continue to merge geographic and other non-educational secondary data sources with available student databases.

Appendix A: Supplemental Results from Chapter 1

Logistic regression predicting whether a student has geographic data

Number of observations
= 108,686

Pseudo r-squared = .039

Dependent Variable=

Indicator for student having matched address and assignment data

Independent Variables	Odds Ratio	Std. Err.	P>z
Student Race (Ref Group= White)			
Black	1.35	0.08	0.00
Latino	0.78	0.07	0.01
Asian	1.07	0.12	0.57
Multi/Other	1.09	0.10	0.38
Free/Reduced Lunch Eligible	1.04	0.10	0.65
Race * FRL Interaction (Ref Group = White * not FRL)			
Black * FRL	0.95	0.10	0.63
Latino * FRL	1.17	0.16	0.25
Asian * FRL	0.67	0.13	0.05
Multi/Other * FRL	0.93	0.15	0.63
Geography of Students' Assigned School (Ref Group = Urban)			
Suburb or Town	1.93	0.11	0.00
Rural	1.06	0.05	0.26
Race * Geography Interaction (Ref Group = White * Urban)			
Black * Suburb or Town	0.41	0.04	0.00
Black * Rural	0.76	0.07	0.00
Latino * Suburb or Town	0.57	0.10	0.00
Latino * Rural	1.22	0.19	0.20
Asian * Suburb or Town	0.62	0.14	0.04
Asian * Rural	0.70	0.15	0.10
Multi/Other * Suburb or Town	0.88	0.15	0.45
Multi/Other * Rural	0.75	0.10	0.04

Geography * FRL Interaction (Ref Group = Urban * not FRL)				
	Suburb or Town * FRL	0.53	0.07	0.00
	Rural * FRL	0.88	0.09	0.22
Race * FRL * Geography Interaction (Ref Group = White * not FRL * Urban)				
	Black * FRL * Suburb or Town	2.29	0.37	0.00
	Black * FRL * Rural	1.19	0.17	0.24
	Latino * FRL * Suburb or Town	2.12	0.46	0.00
	Latino * FRL * Rural	1.14	0.23	0.51
	Asian * FRL * Suburb or Town	1.97	0.77	0.08
	Asian * FRL * Rural	3.32	1.42	0.01
	Multi/Other * FRL * Suburb or Town	1.11	0.28	0.67
	Multi/Other * FRL * Rural	0.88	0.19	0.53
Other Independent Variables in Model				
	Lagged 5-year District Population Growth	0.63	0.03	0.00
	Standardized Math Performance	1.09	0.01	0.00
	Math Score Missing Indicator	1.26	0.31	0.35
	Limited English Proficient	1.15	0.06	0.01
	LEP Missing Indicator	0.90	0.20	0.63
	Female Indicator	1.05	0.02	0.02
	Old for Grade Indicator	0.88	0.03	0.00
	Old for Grade Missing Indicator	0.25	0.06	0.00

Logistic regression predicting whether a student complies with their school assignment

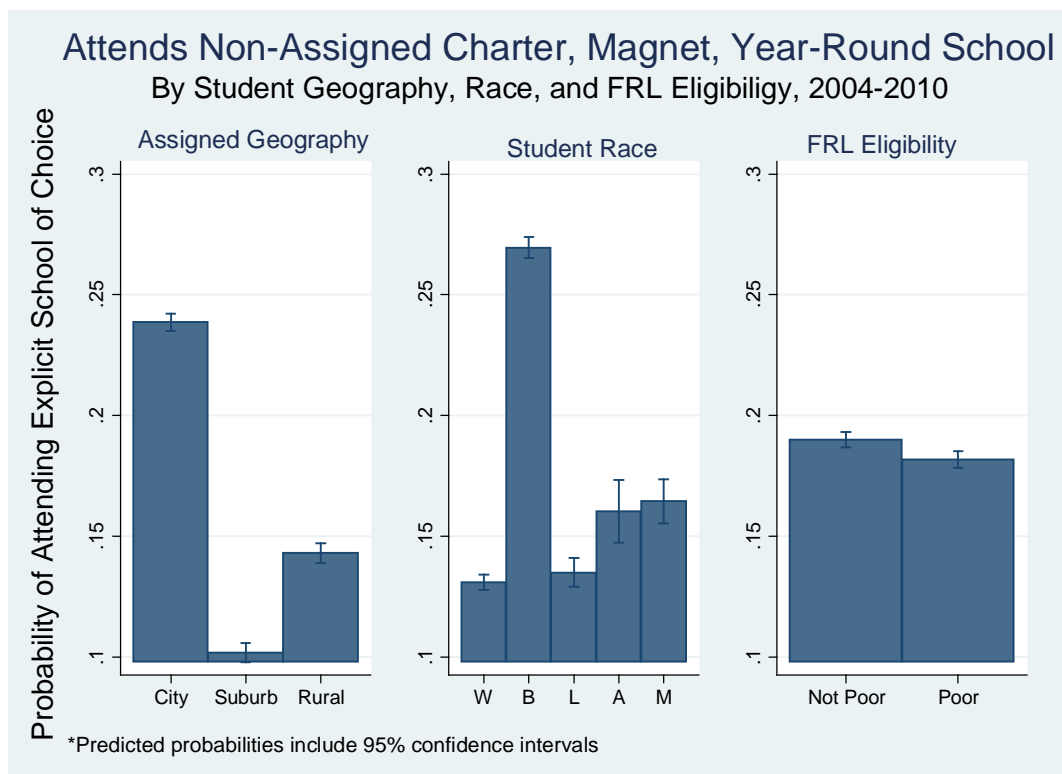
Number of Observations = 89,374

Pseudo R2= 0.082

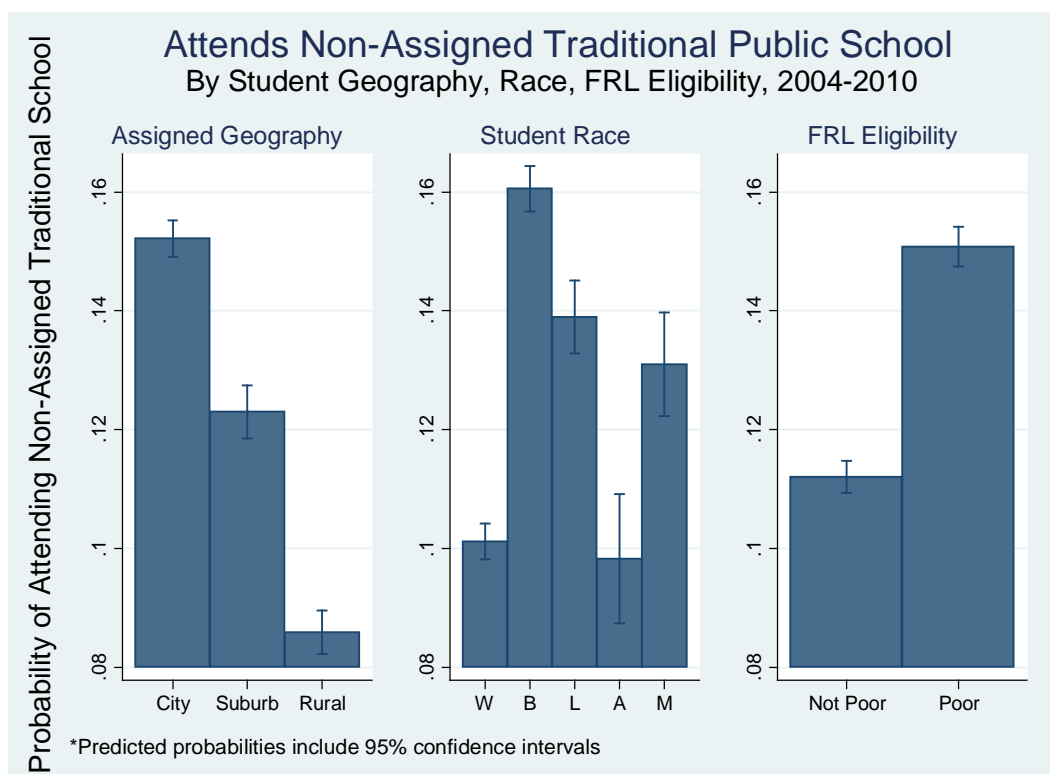
Dependent Variable=

Indicator for student not attending assigned school this year

Independent Variables	Odds Ratio	Std. Err.	P>z
Student Race (Ref Group= White)			
Black	2.11	0.05	0.00
Latino	1.41	0.05	0.00
Asian	0.92	0.05	0.11
Multi/Other	1.51	0.06	0.00
Students' FRL Eligibility(Ref Group = Not Poor)			
Free/Reduced Lunch Eligible	0.96	0.02	0.02
Geography of Students' Assigned School (Ref Group = Urban)			
Suburb or Town	0.63	0.01	0.00
Rural	0.54	0.01	0.00
Other Independent Variables in Model			
Lagged 5-year District Population Growth	0.86	0.03	0.00
Standardized Math Performance	1.06	0.01	0.00
Math Score Missing Indicator	1.42	0.20	0.01
Limited English Proficient	0.80	0.03	0.00
LEP Missing Indicator	1.89	0.28	0.00
Female Indicator	0.98	0.02	0.22
Old for Grade Indicator	0.88	0.02	0.00
Old for Grade Missing Indicator	0.63	0.10	0.00



**Weighted Predicted Probability of Attending School of Choice by
Select Student Covariates**



Weighted Predicted Probability of Attending Non-Assigned Traditional Public School by Select Student Covariates

Appendix B: Supplemental Results from Chapter 2

Logistic regression predicting whether a student is reassigned

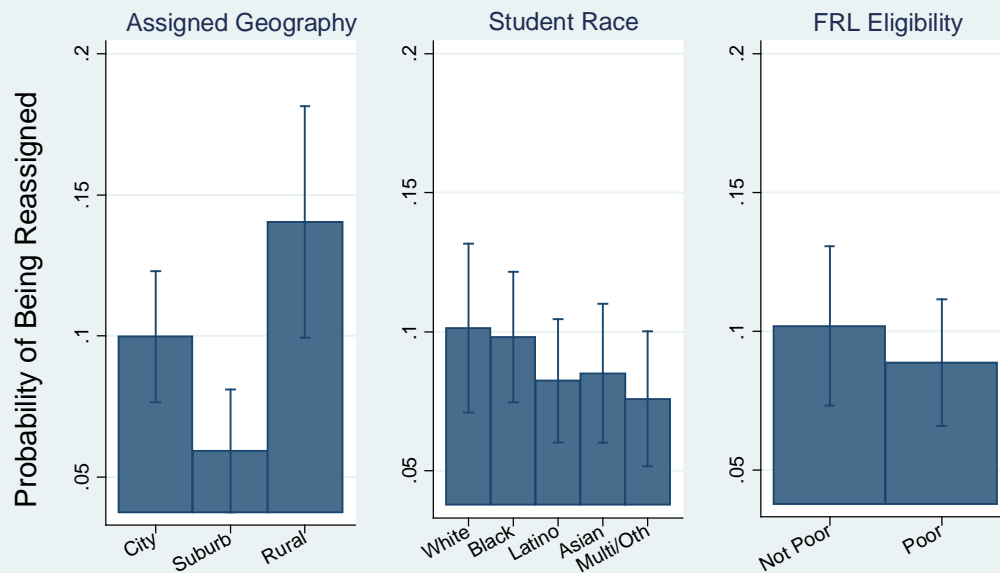
Number of Observations = 62,623

Pseudo R2= 0.178

Dependent Variable= Indicator for Being Reassigned			
Independent Variables	Odds Ratio	Std. Err.	P>z
Student Race (Ref Group= White)			
Black	1.14	0.08	0.05
Latino	0.92	0.10	0.47
Asian	1.12	0.16	0.40
Multi/Other	0.99	0.11	0.96
Students' FRL Eligibility(Ref Group = Not Poor)			
Free/Reduced Lunch Eligible	1.16	0.66	0.01
Geography of Students' Assigned School (Ref Group = Urban)			
Suburb or Town	0.23	0.02	0.00
Rural	0.44	0.05	0.00
Other Independent Variables in Model (All are calculated in initial school year)			
Lagged 5-year District Population Growth	0.24	0.02	0.00
School Percent FRL	0.05	0.02	0.00
School Percent Minority Students	37.73	10.74	0.00
School Size (log)	3.26	0.40	0.00
School Percent of Students at Grade Level in Reading	8.62	2.42	0.00
Standardized Math Performance	0.96	0.02	0.12
Math Score Missing Indicator	0.38	0.39	0.34
Limited English Proficient	1.07	0.12	0.58
LEP Missing Indicator	4.06	1.93	0.00
Female Indicator	1.07	0.05	0.11
Old for Grade Indicator	1.09	0.07	0.20
Old for Grade Missing Indicator	2.12	2.22	0.47

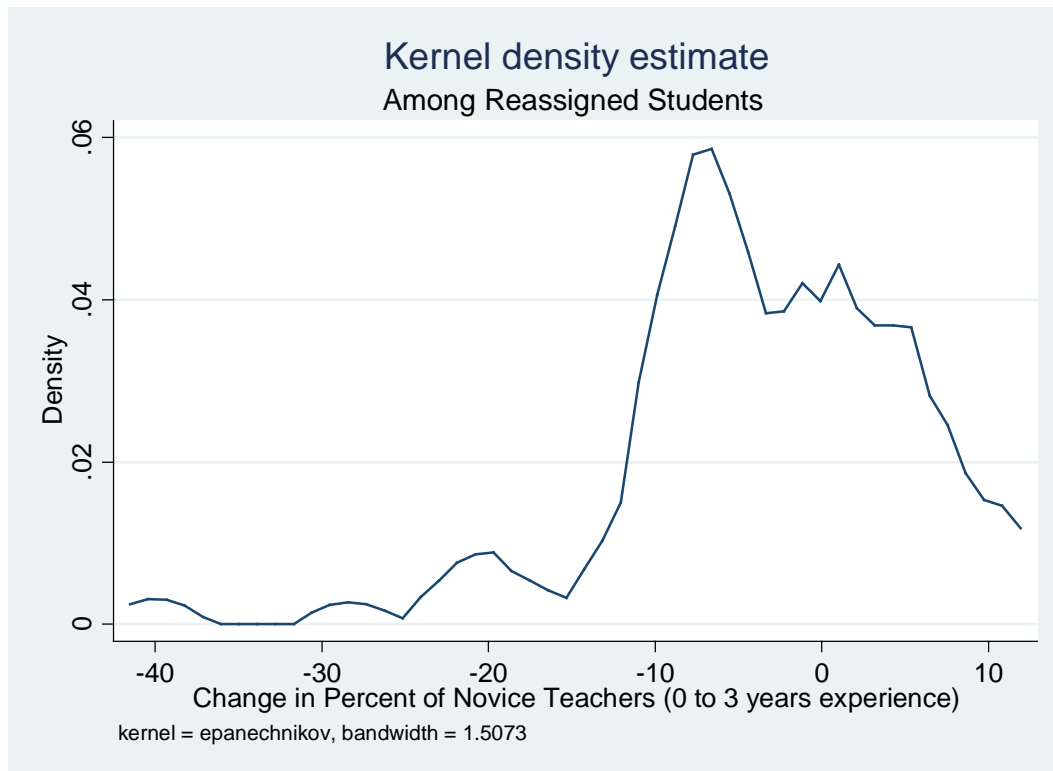
Likelihood of Student Reassignment by Select Covariates

Student Geography, Race, and FRL Eligibility; 2004-2010

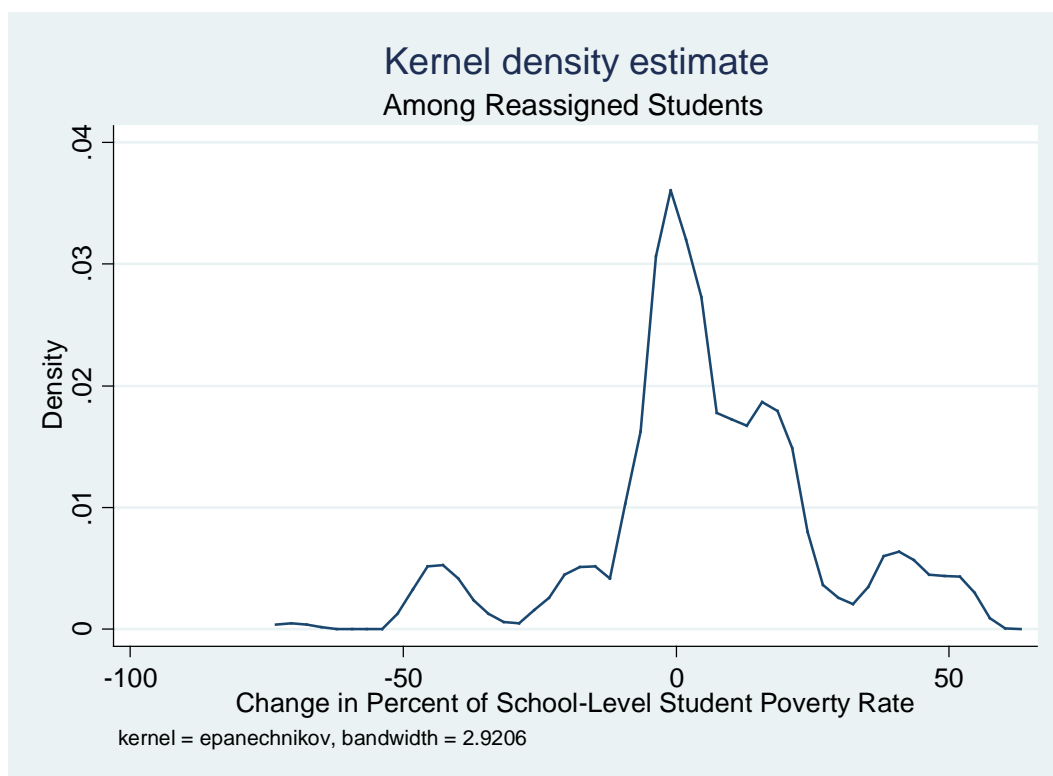


*Predicted probabilities include 95% confidence intervals

Weighted Predicted Probability for Reassignment by Select Covariates

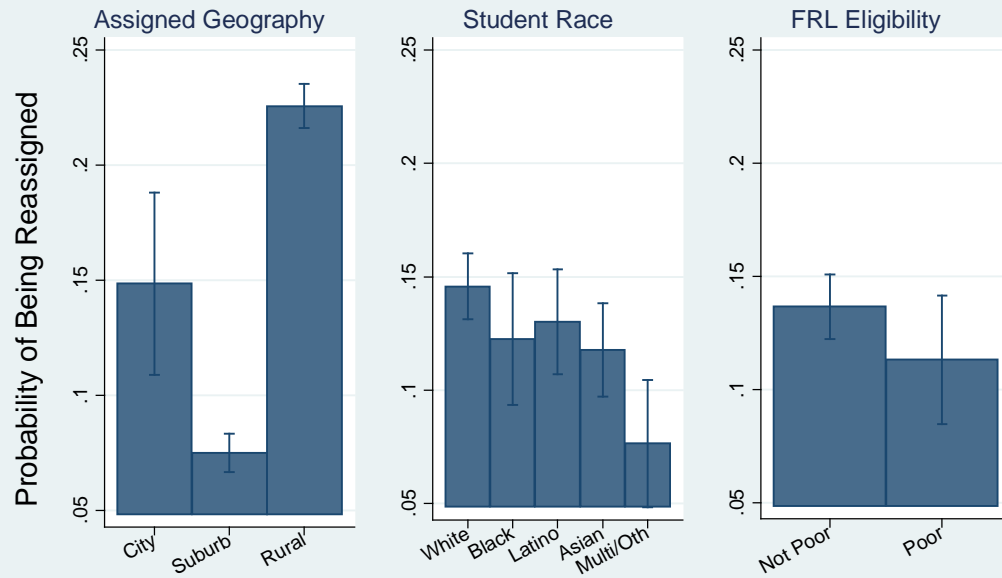


**Kernel Density Distribution of Change in Percent Novice Teachers
Among Reassigned Students**



**Kernel Density Distribution of Change in Percent Novice Teachers
Among Reassigned Students**

Reassignment to School with More Poverty and More Novice Teachers By Select Covariates, 2004-2010



*Predicted probabilities include 95% confidence intervals

**Weighted Predicted Probability of Reassignment to Worse School,
by Select Covariates, 2004-2010**

Appendix C: Supplemental Results from Chapter 3

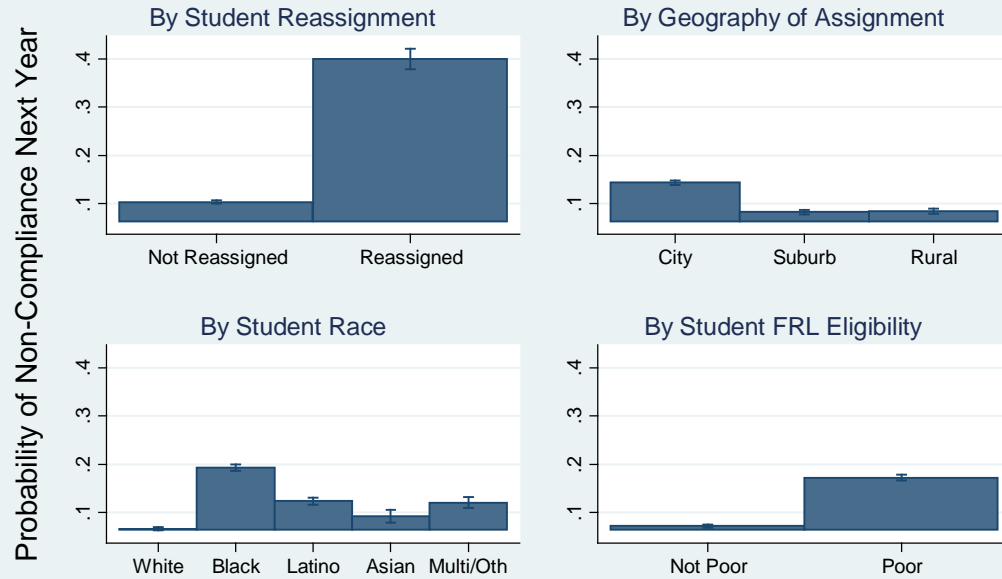
Logistic regression predicting whether a student does not comply with next year's school assignment

Number of Observations = 57,891

Pseudo R² = 0.094

Dependent Variable= Indicator for Not complying with next year's assignment			
Independent Variables	Odds Ratio	Std. Err.	P>z
Student Race (Ref Group= White)			
Black	1.44	0.06	0.00
Latino	0.89	0.06	0.06
Asian	1.05	0.09	0.58
Multi/Other	1.26	0.08	0.00
Students' FRL Eligibility(Ref Group = Not Poor)			
Free/Reduced Lunch Eligible	1.55	0.05	0.00
Geography of Students' Assigned School (Ref Group = Urban)			
Suburb or Town	0.95	0.04	0.18
Rural	0.92	0.04	0.06
Other Independent Variables in Model (All are calculated in initial school year)			
Indicator for being Reassigned	8.10	0.45	0.00
Lagged 5-year District Population Growth	1.66	0.28	0.00
School Percent FRL	2.17	0.31	0.00
School Percent Minority Students	0.89	0.04	0.02
School Size (log)	1.50	0.16	0.00
School Percent of Students at Grade Level in Reading	1.17	0.05	0.00
Standardized Math Performance	0.87	0.01	0.00
Math Score Missing Indicator	1.08	0.26	0.76
Limited English Proficient	0.89	0.05	0.05
LEP Missing Indicator	1.00	0.29	0.99
Female Indicator	1.02	0.03	0.37
Old for Grade Indicator	1.06	0.04	0.10
Old for Grade Missing Indicator	1.03	0.26	0.91

Non-Compliance with Next Year's School Assignments By Select Covariates, 2001-2010



*Predicted probabilities include 95% confidence intervals

Weighted Predicted Probability of Noncompliance with Next Year's School Assignment, by Select Covariates, 2004-2010

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Biography

Sara Tova Pilzer Weiss hails from Atlanta, Georgia. She holds a B.A., B.S., and M.S. from the University of Georgia, where she graduated summa cum laude and Phi Beta Kappa, and was a Foundation Fellow. Sara was a Fulbright Fellow in South Korea, where she taught English in an all girls' public high school. She attended Duke as a Society of Duke Fellow, and taught two undergraduate policy classes at Duke on poverty. While at Duke, she collaborated on research projects addressing how to measure principal quality using teacher surveys, the effects of early childhood programs on elementary school exceptionality identification, and the impacts of big time college athletics on non-athletes. In the summers, she was a teaching assistant for the longitudinal data analysis class at the Interuniversity Consortium for Political and Social Research (ICPSR) Summer Program in Ann Arbor, MI. Currently, she is a Research Scholar on the Evaluation Team at the Friday Institute for Educational Innovation at North Carolina State University, where she helps manage and analyze large, quantitative datasets in the evaluation of North Carolina's implementation of its federal Race to the Top (RttT) grant.